Detailed Project Report and Environmental Impact Statement

(4)

(FINAL)

Limestone Creek
Manlius, New York

Section 205 of the 1948 Flood Control Act

US Army Corps
of Engineers
Buffalo District

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The recommended plan provides a 100 year level of protection along the main branch of Limestone Creek in the village of Manlius. The project calls for channelization of the existing Main Branch, excavation of a diversion channel (to be used only for high flows), and the lining of the diversion and portions of the natural channel in fabric formed concrete. A new bridge over the Main Branch of Limestone Creek would be constructed to eliminate the constriction of flows under Route 173.

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OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE
Orin Lehman
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
The Governor Nelson A. Rockefeller Empire State Plaza
Agency Building 1, Albany, New York 12238

518-474-0456

January 11, 1988

Colonel Daniel R. Clark
United States Army Commanding
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Colonel Clark:

RE: Corps
Limestone Creek Flood Protection Project
Manlius, Onondaga County

The State Historic Preservation Officer (SHPO) has reviewed the Cultural Resources Survey Report on the above project in accordance with Section 106 of the National Historic Preservation Act of 1966 and the Advisory Council on Historic Preservation's regulations, 36 CFR 800/801.

Based upon this review, it is the opinion of the SHPO that this project will have no effect upon archeological resources included in or eligible for inclusion in the National Register of Historic Places.

If you have any questions, please contact the project review staff at (518) 474-3176.

Sincerely,

Julia S. Stokes
Deputy Commissioner for
Historic Preservation

JSSS:LLH:eb
PR18 (9/87)

ADDENDUM - CULTURAL RESOURCES
Limestone Creek at Manlius, New York
Section 205 - Flood Damage Reduction Study
Final DPR and Final EIS

1. Supplemental cultural resources investigation and coordination relative to potential impacts due to diversion channel construction has been completed. No significant adverse impacts to any significant cultural resources would be anticipated due to diversion channel construction. A letter of concurrence of study findings from the New York State Office of Parks, Recreation, and Historic Preservation is attached. The study is in compliance with cultural resources related laws and regulations for this phase of planning.

2. This addendum is to amend statements in the Final DPR and Final EIS pertaining to cultural resources investigations including those on: DPR, page 8; EIS, pages iv, v, 9h, 25,44,49,50; and Environmental Appendix D - Cultural Resources Compliance. Changes to the Final DPR and Final EIS could not be made prior to reproduction of the reports; therefore, these changes are being made by addendum.

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207

February 1988

SYLLABUS

The Commander of the Buffalo District of the U.S. Army Corps of Engineers recommends the construction of a flood control project on Limestone Creek in Manlius, New York.

The recommended plan is the result of a long and coordinated plan formulation effort which resolved difficult economic, engineering, environmental and financial problems.

The recommended plan provides a 100 year level of protection along the Main Branch of Limestone Creek in the village of Manlius. The project calls for channelization of the existing Main Branch, excavation of a diversion channel (to be used only for high flows), and the lining of the diversion and portions of the natural channel in fabric formed concrete. A new bridge over the Main Branch of Limestone Creek would be constructed to eliminate the constriction of flows under Route 173.

The estimated first cost of the proposed plan is $3,617,000 with a benefit-cost ratio of 1.45. The Federal Government would pay an estimated $2,671,050. The non-Federal share of costs is estimated to be $945,950.

DETAILED PROJECT REPORT
AND
ENVIRONMENTAL IMPACT STATEMENT
FOR THE
SECTION 205 FLOOD CONTROL STUDY
LIMESTONE CREEK AT MANLIUS

MAIN REPORT

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DETAILED PROJECT REPORT
FLOOD DAMAGE REDUCTION
LIMESTONE CREEK IN MANLIUS, NY

AUTHORITY

This report summarizes the results of a study of the flooding problems along Limestone Creek and its tributaries in the village of Manlius, NY. The authority to conduct this study was granted to the Secretary of the Army under Section 205 of the 1948 Flood Control Act, as amended. That act was amended by Public Law 99-662 (17 November 1986) to allow up to $5,000,000 to be spent to study and implement flood control.

PURPOSE AND SCOPE

This is a Final Feasibility Report which recommends construction of a project to reduce flood-related damages in the village of Manlius. That recommendation is the result of an analysis of the water-related needs and opportunities of Manlius and other communities in the Limestone Creek watershed. Figure 1 shows the general location of Manlius in New York State. Figure 2 shows the location of the village of Manlius in relation to Syracuse and to other communities drained by Limestone Creek.

The initial request for a flood control investigation encompassed only the area drained by the West Branch of Limestone Creek. Early in the study it became evident that the Main Branch of Limestone Creek could cause significantly greater damage than the West Branch, so the scope of the study was expanded to investigate the areas drained by the Main Branch of Limestone Creek. Baseline damage data were collected for the towns of Pompey and Manlius. A regional flood control reservoir was considered for the town of Pompey, but it was determined that a reservoir was not a viable alternative (see Alternative Plans Developed with the McIntyre Dam in-place for details). A review of the damage-frequency data indicated that the study area should be reduced to the village of Manlius itself.

STUDY METHODS

There are two primary objectives of this report. The first is to determine if a contribution to National Economic Development (NED) can be made by reducing flood damages in the village of Manlius. The report will show that that can be done.

The second objective of the report is the identification of the plan which reasonably maximizes net NED benefits, protects the Nation's environment, and best addresses the problems and opportunities created by the existing situation in Manlius.

The method of analysis used in meeting both objectives is the same, and is consistent with the planning guidance used by all Federal agencies. During the study:

a. The existing conditions of the study area were investigated and catalogued.

Information was collected and analyzed to quantify the frequency and severity of flooding and flood related problems. The present human and natural environments were defined by field studies and reviews of existing data.

Baseline data was organized into four accounts:

(1) The national economic development (NED) account includes data pertinent to the national output of goods and services.

(2) The environmental quality (EQ) account includes nonmonetary data concerning natural and cultural resources.

(3) The regional economic development (RED) account reflects data pertinent to the distribution of economic activity in the region of the study area.

(4) A final category, called "other social effects" (OSE) reflects data relevant to the decisions about flood control which are not reflected in the other three accounts.

b. A description of likely future conditions in the study area with no Federal flood control action was developed for the same accounts specified in Step (a) for the existing conditions. Forecasts were based on historical trends in the study area and the region, as well as existing legislation and programs which regulate future development. The future scenario extends over a 50-year period starting from the estimated time of project implementation (1990). The nominal useful lifespan for a structural flood control project is 50 years.

c. Several alternative plans were developed which address the needs and opportunities developed in Step (a). Estimates were made of the construction and maintenance costs. Construction costs were treated as an investment and discounted over the 50-year project life, producing an annual cost. Estimates of the effect of each alternative on the NED, EQ, RED, and OSE accounts were made. One alternative was identified which maximized net benefits to the NED account. That plan was developed in detail so as to maximize the benefit (or minimize the harm) in the other three accounts.

HISTORY OF THIS STUDY

In July 1974, a flood along the West Branch of Limestone Creek in the village of Manlius renewed local interest in finding a solution to the area's flooding problems. Onondaga County requested a Reconnaissance Study by the Buffalo District Corps of Engineers to determine if a detailed study was warranted. The Reconnsiassance Study was initiated in August 1976. In August 1977, the completed Reconnaissance Study recommending further study was approved by the North Central Division of the Corps. A detailed project study was initiated in October 1979. In October 1981, another major flood along both the Main and West Branches of Limestone Creek caused over $1,000,000

damage in the village. A dam located just downstream of the village, for which major repairs had been scheduled, suffered substantial additional damage. Plans to refurbish the dam were abandoned, and it was completely removed in 1982. The removal of the dam and the subsequent change in the hydraulic characteristics of the creek made the structural flood control alternatives developed by the Buffalo District inadequate. Plans were formulated again in coordination with Federal, State, and local officials, as well as interested environmental and business groups and the general public. This report describes both plan formulation processes and the resultant recommendation.

PRIOR STUDIES AND REPORTS

Flooding problems along Limestone Creek and other creeks flowing into Oneida Lake have been the subject of several studies by the Corps and other agencies since 1939. Figure 2 shows the relationship between Limestone Creek, the West Branch of Limestone Creek, Butternut Creek and Chittenango Creek.

Butternut Creek flows into Limestone Creek north of the project area. Limestone Creek then flows into Chittenango Creek, which in turn empties into Oneida Lake.

The Butternut-Limestone-Chittenango Creek watershed was first studied by the Corps in 1939. A Preliminary Report in that year led Congress to authorize a more exhaustive review. A survey report was submitted to Congress in 1941 and a definite project report was published in 1947. The 1947 report found that the amount of flooding damages in Manlius did not justify the expense of the required flood control project. At that time, damages were mainly agricultural in nature.

A review of that study, prepared in 1967, again found that despite commercial and industrial development in the village, the cost of a flood control project exceeded the benefits that such a project would provide. The 1967 review analyzed the costs and effectiveness of an upstream reservoir as well as a levee and channelization plan within the village limits. Neither approach could be cost justified, but the reservoir plan was much less cost effective than the levee and channelization plan.

A "Floodplain Information Report - Limestone Creek, Manlius Township" was prepared by the Corps in 1970. No attempt was made in that report to investigate flood control measures. The intent of that report was to provide the public with information about the potential for flood damage in the area.

"Flood Insurance Study - Village of Manlius, New York" was published in March 1978 by the U.S. Department of Housing and Urban Development, Federal Insurance Administration. That report analyzed the frequency and severity of flooding within the village so that flood insurance rates could be established.

Similar flood insurance studies were conducted for Minoa, Pompey, Fayetteville, and the township of Manlius. All these communities, including the village of Manlius, are now covered under the regular flood insurance program.

EXISTING CONDITIONS

The village of Manlius is located in the town of Manlius, about 8 miles east of Syracuse in central New York State. Both Limestone Creek and the West Branch Limestone Creek flow through the village, joining near the village limits. The village is almost completely developed in the flood prone and adjacent areas. There are 55 residences, four commercial, two industrial establishments, and two public buildings within the 100-year flooded outline. (The 100-year flooded outline, shown in Figure 3, encloses the area that would be covered with water during a flood that can be expected to occur once in a hundred years).

The village site is near the base of the Allegany plateau, just upstream of the broad, flat Oneida Lake Plain. Limestone Creek drops about 60 feet in the mile upstream of the village, then begins to flatten out, dropping another 100 feet in the 4 miles from the upstream village limit in Manlius to the dam in Fayetteville, NY. From the dam in Fayetteville to its confluence with Butternut Creek, Limestone has a nearly flat stream gradient.

The West Branch drops even more precipitously, dropping over 200 feet in 2 miles before joining the Main Branch. Much of the village of Manlius lies in the "V" formed by these two steep streams.

The upper part of the watershed, above the village of Manlius, is primarily rural, with forested, rolling hills bordering the creek valley which varies from about 1/2 mile to 1 mile wide in the section between Delphi Falls and Edwards Falls. Limestone Creek meanders through this area which is characterized by agricultural croplands, pasture and hay fields, other farmland in varying stages of abandonment, densely wooded areas, and wetlands. The West Branch between Watervale and the village of Manlius follows a more direct course through a narrow flood plain. The hilly terrain bordering the West Branch is generally agricultural, woodland, and open land.

The lower part of the watershed is suburban in character. Limestone Creek flows through the villages of Manlius, Fayetteville, and Minoa before joining Butternut Creek. Although there is considerable commercial and residential development in this section, there are many wooded, open and wetland areas along the creek and within the flood plain.

AQUATIC RESOURCES

a. Water Quality. The New York State Department of Environmental Conservation (NYSDEC) assigned classifications and quality standards for the waters of Limestone Creek according to best usage. The entire length of the West Branch is classified C(t). Class C waters are suitable for fishing and any other uses except primary contact recreation and as a source of water supply for drinking, culinary or food processing purposes. The symbol (t) means that these are trout waters and the dissolved oxygen specification of not less than 5.0 ppm applies. The Main Branch from the mouth to the New York Route 5 crossing in Fayetteville is Class C. From the Route 5 crossing to the outlet of Pond 138a (the reservoir upstream from Edwards Falls) the waters are designated C(t). The section from and including Pond 138a to the

source is Class B(t). Class B waters are suitable for primary contact recreation and other uses except as a source of water supply for drinking, culinary or food processing purposes.

There are indicated quality problems (dissolved oxygen less than the classification) in the lower section of West Branch where it enters the village of Manlius, and in the Main Branch from Manlius to Butternut Creek. There have been no recent ongoing water quality monitoring studies done on Limestone Creek. According to the Onondaga County Health Department, water quality is generally good in both the Main Branch and the West Branch. Some water quality problems occur in the lower 7 miles of the Main Branch from north of Fayetteville to the confluence with Butternut Creek as a result of municipal sewage discharges and storm water run-off. There are presently two sewage treatment plants discharging municipal sewage effluent into Limestone Creek. The last of the smaller independent facilities was eliminated in the summer of 1979. The Meadowbrook-Limestone Plant, located north of Fayetteville presently receives all sewage from Fayetteville and Manlius and has been achieving secondary treatment standards. The Minoa plant is a secondary treatment plant but has not been meeting secondary standards. Plans for further upgrading of the system are being planned. As a result of the recent and planned improvements in wastewater treatment, continued improvement in water quality in this section of the creek is anticipated.

There are two significant waterfalls and two dams on the Main Branch of Limestone Creek within the study area. Delphi Falls is located just above the point where the DeRuyter Reservoir Outlet joins Limestone Creek. About 9.5 miles downstream there is a dam located approximately 250 feet upstream from Pompey Center Road. This dam forms a shallow, silted reservoir (Pond 138a) about 6 acres in size, much of which is cattail marsh. Edwards Falls is located about 650 feet further downstream, 450 feet below Pompey Center Road. The second dam is located about 3.5 miles further downstream in the village of Fayetteville. This dam is at the point where Limestone Creek feeds the Old Erie Canal, approximately 1,300 feet below Limestone Plaza Road.

Two waterfalls are found on the West Branch within the study area. From Watervale, the creek flows about 2.4 miles to a falls just below the bridge on Broadfield Road. About 0.5 miles further downstream is Brickyard Falls. This falls is located approximately 400 feet below the Gibbs Road crossing.

b. Aquatic/Terrestrial Resources. The 5.5 miles of the Main Branch and 1.44 miles of the West Branch are bounded downstream by the Feeder Canal Dam in Fayetteville, NY, and upstream by Edwards and Brickyard Falls, respectively. Two important tributaries, Main Branch Tributary Nine and West Branch Tributary One provide excellent trout spawning habitat.

The NYSDEC (1970) and the United States Fish and Wildlife Service (USFWS) (1983) report that the area influenced by the project supports a high quality coldwater (trout) fishery. The NYSDEC has placed it among the top 50 trout streams of the State. Excellent stream channel configuration, instream structure and substrate, variable instream flow regime, water quality, aquatic and riparian vegetation, and forage base provides for a superb

aquatic habitat both in the Main and West Branches and the two improtant tributaries. Additionally, Main Branch Tributary Nine and West Branch Tributary One are known to support trout spawning.

Brown and rainbow trout are reported in the project area both by the NYSDEC and USFWS. Recent contact with NYSDEC, Cortland, NY, indicates continued stocking of brown and rainbow trout. In addition to the trout mentioned above, the following species were collected by the USFWS during sampling in 1982: chain pickerel, cutlips minnow, bluntnose minnow, blacknose dace, longnose dace, creek chub, fallfish, pearl dace, white sucker, northern hog sucker, stonecat, banded killifish, rock bass, pumpkinseed, fantail darter, mottled sculpin, and slimy sculpin. The ratio of trout to nontrout species varies from 1:1 in the tributaries to 1:25 in the Main Branch.

There is no formal fisherman access in the project area or the area influenced by it, but informal access is obtained at the several road crossings, the village of Manlius Park, and some commercial properties. The specific number of angler use days is unavailable, but fishermen were observed by USFWS personnel during that agency's 1982 field studies in connection with this report. The reach of the Main Branch to be significantly altered, on the basis of discussions with fishermen, is an apparent favorite of local fishermen.

Land use adjacent to the creek in the project area consists of urbanized areas, light industry, 16 acres of upland forest, and scrub shrubs, parkland, and scrub-shrub to mixed forest elsewhere. The mixed forest on the hillsides near the creek is predominately northern deciduous hardwoods with scattered conifers. Some species of deciduous trees and herbaceous understory have been observed in the riparian zone of the project area.

The nature of the narrow band of riparian vegetation provides excellent habitat for a variety of wildlife. White-tailed deer, raccoons, muskrats, eastern cottontail rabbits, mallards, crows, and other species of birds were observed during the USF&WS study.

The bald eagle and the peregrine falcon may make transistory use of, but are not known to be residents of the area (USF&WS-1982 and NYSDEC-1979). The Federally listed small whorled pogonia (Isotria medeoloides) is reported from the Limestone Creek drainage, but since it requires a dry wooded with acid soil habitat (Gleason-1963) it is not likely found in the project area. Several other species of fish and wildlife found in the project area are provided protection by New York State but only the above species are provided special protection under threatened and endangered status by New York State or the Federal Government.

CLIMATE

The Syracuse area can be characterized as humid, with an average annual rainfall of 38 inches. Monthly average temperatures range from 24°F to 72°F. Air quality in the area is generally better than established State and Federal standards, and should improve as Syracuse's industrial base declines and industry throughout the country reduces emissions.

GEOTECHNICAL INFORMATION

The surficial sediments in the study area are composed of fill, alluvial and gracial till deposits. The till, underlying the entire area, is composed of fairly dense clays and silts with some sands and gravels. The sediment immediately adjacent to the creek is composed of poorly sorted clays, silts, sands, and gravels. The upstream limit of the project is composed of silty sand overlying gravel. The depth to gravel varies between 1 to 2 feet. This sediment is recent alluvium. In the area of the left overbank behind Tyler Court in the village, the sediment is primarily composed of laminated fine sands, silts, and clays to an approximate depth of 5 feet. The origin of this sediment is recent overbank alluvium. Along the main stem between this same stationing, the sediment is composed of sand, silt, and clay overlying gravel of recent alluvial origin with fill in some areas. From the confluence up the West Branch to the study limits, the sediment is composed of clay, silt, sand, and gravel of recent alluvial origin. From the confluence to the downstream limit of the study area in the main stem, the sediment adjacent to the channel is primarily sand, silt, and clay. Fill of an unknown thickness overlies recent alluvial material.

A preliminary sedimentation survey was conducted to determine the size of the sediments that will be moved for various flow events. For this sedimenation analysis, the project area was divided into four reaches based upon significant changes in slope, velocity, water depth, and discharge. Sediment sampling was conducted within each reach. The sediment in the channel and on the bars is composed of well rounded shales, siltstones, limestones, sandstones, and dolostones. Igneovs and metamorphic rocks from glacial deposits are also present. Sediment sizes range between 6-17 inches for the armored layer to finer gravels and sands below. Based upon the reconnaissance field investigation, it is apparent that large quantities of sediment are moved within the project. Deposition occurs downstream from the project limits where the gradient decreases and the width increases.

WATER SUPPLY AND SANITARY SEWAGE

Water supply for the village is presently purchased from the Onondaga County Water Authority (OCWA). OCWA has its own delivery system which draws water from Otisco Lake. In addition, OCWA contracts for water from the Metropolitan Water Board, which draws water from Lake Ontario. Present water supply systems are considered more than sufficient for the area growth expected in this century.

Sanitary sewage service is provided jointly by Onondaga County and the village of Manlius. A lift station is located on the right bank of Limestone Creek just downstream of the confluence to the Main and West Branches.

HUMAN ENVIRONMENT

Manlius' geographical location, history, and its proximity to Syracuse define its present day characteristics. Its history as a center of industry is still evident in the broad range of land use within the village limits, but its role as a residential suburb of Syracuse has become just as important

in its economic development. Manlius' position between the two branches of Limestone Creek, at the base of the Allegany Plateau has created enviromental and economic benefits as well as a persistent flooding problem.

The village of Manlius was an important industrial town in the early 1800's, but lost its local predominance to Fayetteville and Syracuse later in the 19th century after the construction of the Erie Canal and railroad lines. The water power provided by Limestone Creek supported several mills until the early twentieth century, when the general availability of electric power undermined that advantage. Agricultural advancements reduced the surrounding farmland population and the great depression caused further harm to the industrial-commercial base. After World War II, Manlius grew primarily as a residential suburb of Syracuse.

Today the village's industries are still concentrated near the Main Branch of Limestone Creek. There is an industrial park on the left bank upstream of the Route 173 bridge which includes two large Magnavox office & manufacturing buildings. Employment at Magnavox increased in 1984 from about 750 to 900.

Production Products Company is located on the left bank, about 400 feet downstream of the Route 173 Bridge. This company makes machined parts, including hardware for cable television. Most of the damages that can be expected from flooding in the village of Manlius are damages to the inventory, equipment, and structures of Production Products.

Much of the village's commercial activity is located in the "V" formed by the Main and West Branches of Limestone Creek, and includes two supermarkets, a drug store, gas station, and a small shopping plaza. Some flooding damage to these establishments can be expected. An electric power substation and village garage on Mill Street are within the 100-year flooded outline.

The majority of the remaining land that could be affected by flooding is used for housing. Included are low rise apartments on the right bank of the Main Branch, and single family residences ranging from inexpensive older homes on Mill Street upstream of the Route 173 Bridge on the Main Branch to fairly expensive newer homes along the West Branch.

Many Manlius residents work outside of the village limits. Total employment in the Syracuse Metropolitan area is increasing slowly while average income is increasing faster than the national average. Manufacturing is still the area's largest employer, with 22 percent of the total workforce, but manufacturing employment is steadily declining. The population of the city of Syracuse is declining while populations of the suburban areas, including the town and village of Manlius, increase.

More detailed information on the existing economic conditions in the area can be found in the Economics Appendix to this report.

CULTURAL RESOURCES

The site of the present village may have been visited by small nomadic groups as early as 4000 B.C., but there is no evidence of any settlement at the junction of the Main and West Branches before 1790. A water powered sawmill was constructed in the village area by 1793.

The availability of water power and limestone encouraged the growth of the village. By 1824, the village contained about 100 dwellings, a cotton factory, four grain mills, five sawmills, two fulling mills, two carding machines, two nail factories, an oil mill, and woolen factory. Although the village's industrial position relative to other communities in Central New York was to decline with the completion of the Erie Canal in 1825, numerous village industries survived into the twentieth century.

Manlius' cultural heritage is preserved primarily, then, in structures from the 19th and early 20th century. No structures near the creek have been nominated for the National Register of Historic Places, but there are some buildings and raceways near the creek that are of historical interest. They include:

a. The Gray-Syracuse Buildings, just upstream of the Route 173 Bridge on the right bank of the Main Branch. This complex was formerly owned by S. Cheney and Son, and dates to about 1860.

b. The CN&R Car Repair, West Seneca Street, a 19th century structure near the West Branch.

HISTORY OF FLOODING

Flooding in the village of Manlius can be caused by heavy rainfall during warm weather, or snowmelt sometimes combined with rain during the spring. Because the Main and West Branches drain different drainage areas, floodwaters can come from one or both branches.

A gage which records the water elevation in Limestone Creek at Fayetteville was installed by the United States Geological Survey in 1939. Calculations of the discharge (in cubic feet of water flowing per second) can be made based on the gage records and basin topography. These discharge measurements allow quantitative comparison of floods in Fayetteville, and provide assistance in measuring and predicting floods in Manlius. It should be noted that the gage in Fayetteville is an indicator of the combined flows of the Main and West Branches. Serious floods on the West Branch only may not cause a serious increase in the combined flows.

Historical records indicate that there were major floods in August 1898 when a dam on the Main Branch was washed away, and September 1915, when a bridge over the West Branch was destroyed (Photo 1). The most significant recorded discharges since 1939 and their expected recurrence intervals include:

a. 31 March 1940. Caused by snowmelt and moderate to heavy rains at the end of March; 3,470 cfs - 3-year.

b. June 1947. Caused by heavy rain; 5,170 cfs - 10-year

c. March 1950. A blizzard, followed by two heavy rainstorms and warm temperatures caused one of the two hightest discharges recorded; 7,010 cfs - 20-year.

d. March 1960. Again, heavy rain and snowmelt combined to cause serious flooding; 6,060 cfs - 15-year.

e. July 1974. This was approximately a 100-year event on the West Branch, but only a 5-year event on the Main Branch. Although the West Branch drains only 23.1 square miles (the Main Branch at the confluence drains 51.0 square miles), the discharge on the West Branch reached 3,000 cubic feet per second (cfs) while the Main Branch peaked at 2,400 cfs. The West Branch began to rise from a discharge of less than 100 cfs at 5 a.m. on 3 July. It peaked at about 8 a.m. and receded to normal that afternoon (3 July). The Main Branch began to rise at the same time, but didn't peak until noon and receded over the next 2 days. Flooding damage was worst along the West Branch subdivisions and the Tyler Court area (These are shown on Figure 4).

f. October 1981. This was the greatest recorded discharge (7,490 cfs) at Fayetteville; approximately a 40-year event. High water marks in the village of Manlius indicate that peak flows for the West and Main Branches were about the same, or about 3,600 cfs. This is equivalent to about a 10-year event on the Main Branch and about a 175-year event on the West Branch. The McIntyre Dam, just downstream of the confluence of the two branches, was damaged badly enough to preclude repair. A portion of a house located near the dam was destroyed.

The earthen levee protecting Production Products failed, causing over $800,000 damage to buildings, inventory, equipment, and in lost production. Apartments across the creek from Production Products experienced only basement flooding. The Tyler Court and Mill Street areas received only lawn and backyard damage. There was considerable erosion along the right bank of the West Branch near Westbrook Circle, and six homes in that area experienced flooding, aggravated by the fact that the West Branch Bridge was 75 percent blocked (Photo 3).

HISTORY OF FLOOD CONTROL

Dams have been constructed and removed or destroyed on the Main Branch of Limestone Creek since industry began to develop in the village in the 1800's. Although the primary purpose of these dams was to harness water power, they also affected the nature and location of flooding.

In recent history there have been numerous non-Federal efforts to reduce the potential for flooding and land erosion. Of special note is the work done with New York State Funds in 1982 after the 1981 flood. Refer to Figure 5 which shows existing bank work. Starting near the upstream limits of the village, mixed size (4-inch to 12-inch) stone cover was installed on the right bank across the creek from the Magnavox office building (Photo 2). Downstream of the Route 173 Bridge, the left bank has been stabilized by the placement of concrete blocks along the existing top of bank. These concrete blocks abut an existing floodwall at Production Products. That floodwall was built circa 1960; concrete blocks have also been placed on top of this floodwall. An earthen levee abutting the floodwall continues downstream for about 200 feet. This levee is a reconstruction of the levee that failed in the October 1981 flood. It is of sufficient height to protect against a 5-year flood, but it's likely that it would fail before it was overtopped, due to its inadequate construction as a flood retention levee.

The approximately right angle confluence between the Main and West Branches was reshaped slightly during the 1982 work to form an acute angle. No attempt was made to calculate the reduction in flood water heights as a result of this realignment, but it was felt that realignment would reduce the interference to the Main Branch flows caused by the high velocity discharge from the West Branch into the Main Branch.

Additional shore protection in the form of 6 to 18-inch stone was placed on the left bank below the confluence in the area that had been the left side of the McIntyre Dam. The McIntyre Dam was completely removed, which lowers floodwaters for a distance of about 800 to 1,000 feet upstream. On the West Branch, concrete blocks have been placed on the left bank opposite Westbrook Circle.

Generally speaking, the existing flood control works in the village of Manlius are too low or too weak to protect against floods that can be expected once every 10 years. Some damages can be expected from 2-year floods.

FUTURE CONDITIONS WITH NO FEDERAL FLOOD CONTROL ACTION

The village of Manlius is almost completely developed in the flood plain. Only three small parcels of land have no structures on them.

The village is covered under the regular flood insurance program, and has adopted zoning ordinances which prohibit new structures which have first floor elevations below the 100-year flood level. Since new structures would have to built on a substantial amount of fill in a small area, or elevated on columns, it was assumed during this evaluation that no new structures would be added to the flood plain during the period 1989-2039.

In the past, major floods have sometimes generated action on a local or State level to prevent further damage, but lack of sufficient funding has always limited the scope of these measures. Based on this experience, an assumption was made that no substantial non-Federal flood control would be provided.

Although it is assumed that no new structures will be added within the 100-year flood plain, an assumption was made that flood plain residents would increase the value of the contents of their homes. This assumption is routinely made in studies and is based on historical trends. It is called the "affluence factor."

Since the structures in the village are essentially sound, it was presumed that they would remain in use during the entire project life and would be utilized as they are now.

Under existing conditions, statistically predicted average annual damages from flooding and related problems within the village are $415,300. If no Federal action is taken, those damages will increase to an expected average of $417,600 over the next 50 years because of the affluence factor. These figures do not include damages and land loss from erosion.

The existing danger and trauma associated with recurrent and sometimes severe flooding will remain. Property values will remain depressed near the stream and land loss from erosion will continue. Continued erosion will endanger a swimming pool and some residences on the West Branch of Limestone Creek. As in the past, there will be a slow but constant bed load transfer of channel bottom sediment. The location of the creekbed itself can be expected to change in some places after major floods.

The existing natural environment will most likely be maintained. Flood insurance regulations will moderate developmental pressures and problems in other areas of Limestone Creek. Water quality should be maintained at least at Class C(e) levels in the creeks, due to existing regulations on waste water treatment. The excellent natural fisheries habitat, and specifically the trout habitat, should continue, supported by State stocking programs.

PROBLEMS, NEEDS, AND OPPORTUNITIES

a. Summary of Existing and Future Conditions. This study quantified the expected average annual damages from flooding in the village of Manlius. Additional damage will accrue in the form of land lost to erosion. Plans for improvements to existing commercial and industrial plants will be tempered by the threat of flooding damage and existing flood plain regulations. Floods which have a recurrence level of 5 years or more will cause a temporary loss of production and employment at Production Products Company (PPC). Floods which have a recurrence interval of 25 years or more will interrupt production at PPC long enough to effect a loss of production at Magnavox Incorporation, because PPC is a principal supplier of some of the parts assembled by Magnavox. Both PPC and Magnavox are members of an industry which has been operating at near capacity nationwide, so loss of production in Manlius will reduce the gross national product.

Under existing conditions, 40 homes and 4 businesses would be damaged in a 10 year flood. Fifty-five homes, 6 businesses and 2 public buildings would be damaged in a 100 year flood.

The quick rising high velocity flows that occur along Limestone Creek threaten the safety of residents and public servants involved in flood rescue attempts.

Limestone Creek is rated as one of the top 50 trout streams in the State. Studies carried out by USF&WS for this report have verified that there are valuable spawning and feeding waters in the study area.

b. Problem and Opportunity Statements. Based on existing and projected future conditions in the study area, the following problem and opportunity statements summarize the achievements that could be hoped for from this study for the period of analysis (1990-2040):

(1) Reduce economic losses from flooding in the village of Manlius;

(2) Protect or enhance the existing trout habitat in Limestone Creek and its tributaries within the village of Manlius;

(3) Reduce or eliminate the potential for flood related loss of cable television hardware production in the village of Manlius;

(4) Reduce the hazard to life and safety caused by flooding in the village;

(5) Reduce the loss of land and structures as a result of erosion caused by Limestone Creek and the West Branch of Limestone Creek in the village of Manlius;

(6) Protect or enhance the aesthetic environment created by Limestone Creek, its tributaries, and riparian vegetation in an urbanized setting in the village of Manlius.

(7) Promote economic development in and near the town of Manlius by reducing the flood damage threat to potential capital improvements within the village of Manlius.

(8) Protect structures, sites and artifacts that preserve the history of what is now called the village of Manlius.

PLANNING CONSTRAINTS

Planning constraints are factors which might limit the implementation of the "wish list" identified by the problem and opportunity statements.

The following constraints are based on regulations and existing conditions determined during this study. These constraints became an integral part of plan formulation and evaluation:

a. The Corps has no authority to expend money for the sole purpose of providing erosion protection for privately owned, privately used property. ER 1105-2-10, E-3(c) "Limitation on Erosion Protection" states: "Bank stabilization may only be included as an integral part of a plan for preventing flood damage."

b. No plan can be considered acceptable if it increases flood damage in one area because it reduces flood damage in another area. Measures to satisfactorily mitigate or reduce such secondary flooding must be included as an integral part of any plan.

c. Production Products Company is owned by John Mezzalingua, a resident of the village of Manlius for nearly 80 years. Mr. Mezzalingua has contributed much of his time and personal knowledge to this study, and his company would benefit from flood control in the village of Manlius. It has been determined through conversations with Mr. Mezzalingua that good fiscal judgement on his part precludes the commitment of more than a certain amount of his funds to flood control. This constraint is presented in more detail in the Plan Selection section of this report.

d. Executive Order 11988 (24 May 1977) states that no Federal agency should undertake actions which directly or indirectly induce growth in the floodplain unless there is no practical alternative.

e. Executive Order 11990, 24 May 1977, Protection of Wetlands. This order directs Federal agencies to provide leadership in minimizing the destruction, loss or degradation of wetlands.

f. Executive Order 12372, 14 July 1982, Intergovernmental Review of Federal Programs. This order supercedes and revokes previous guidelines for coordination of Federal assistance programs with state and local governments, and provides that Federal agencies shall rely on coordination procedures established by each state.

TWO STAGES OF PLAN FORMULATION PECULIAR TO THIS STUDY

When the October 1981 flood in Manlius struck, the plan formulation process of this study had identified 11 alternative plans for the reduction of future flood damage. Eight of these plans involved channelization, bank protection and drop structures. Four of the plans involved floodproofing of existing structures.

The 1981 flood caused further damage to the McIntyre Dam, which had been badly damaged in the July 1974 flood (Photo 4) Plans had been drawn and funds allocated prior to the flood to repair the dam, but a post-flood decision was made to remove what remained of the dam.

Removal of the dam increased velocities in both branches and lowered water surface elevations from the dam site to points several hundred feet up each branch. The substantial increase in velocities in the lower reaches of both branches were further verified by the HEC-2 backwater computer program.

The eight channelization plans that had been identified previously no longer provided sufficient bank protection to resist the increased erosive forces associated with the higher velocities. A second iteration of plan formulation became necessary. The design work and cost estimation from the first stage was used to screen suggested alternatives in the second stage.

PLAN FORMULATION - ITERATION 1

1. STANDARD MEASURES

Several standard flood damage reduction measures exist which are routinely evaluated in the initial stage of flood control studies. They are grouped into two categories:

a. Structural measures that alter the flow of floodwaters in such a way that flood damage is reduced. Structural measures include:

(1) Reservoirs, which collect large amounts of water during high flows for release at a safe rate later.

(2) Channelization, which includes widening and deepening, increase or decrease of velocities, and other improvements of existing channels to allow safe containment of flood waters.

(3) Levees, which are structures, usually earthen, with a trapezoidal cross section. Levees raise the top of bank elevations above existing ground, thereby increasing within channel capacity.

(4) Floodwalls, which serve the same purpose as levees, have vertical sides and are typically made of reinforced concrete.

(5) Diversions are newly constructed channels which replace or supplement the carrying capacity of existing channels.

b. Nonstructual measures modify the object of the damages but do not alter the behavior of the flood waters. Nonstructural measures include:

(1) Relocation of Flood Plain Residents to Safer Areas. Structures may be removed or relocated. Structually sound units may be moved and repurchased by flood plain residents outside the flood plain.

(2) Elevation of Flood Plain Structures. Structures in some cases may be elevated on columns or on additional fill material.

(3) Floodproofing of Individual Structures. Methods have been developed which can prevent water from entering a structure even though it is immersed in water. These measures are generally limited in application; flooding of more than 3 feet can cause structural damage due to hydrostatic pressures.

(4) Flood Plain Management. This includes any planning efforts that will, in the long-term, reduce the vulnerability of a community to flooding. Regulations associated with the Flood Insurance Program discourage new development in the flood plain.

(5) Flood Warning and Evacuation Procedures.

2. INITIAL SCREENING OF ALTERNATIVES

Stream and flood plain characteristics were determined from field data and computer models. The standard structural and nonstructural measures were assessed against those parameters. The initial measures considered included:

a. Reservoirs. A potential reservoir site was identified at Pompey Hollow, a large, wide agricultural valley 3-miles upstream of Manlius. Topographic maps of the area (see Figure 5) indicated two narrower sections of the valley where dams could be built. The relationship between the depth of water and the volume of water retained behind each dam site was calculated. Plans to regulate the flow of water into and out of the reservoir sites were developed based on a similar site from a more detailed Corps study of a dam/reservoir on Tonawanda Creek. Preliminary cost estimates for both plans were developed based on the Tonawanda Creek Study.

b. Channelization. Widening the channel in Manlius is limited by the expense and disruption associated with the relocation or redesign of structures near the existing channel. The south wall of the Gray-Syracuse building is also the right bank of Limestone Creek. Buildings in the Kinloch Plaza are about 10 feet from the existing top of left bank. The principal Production Products Building is 20 feet from the top of left bank. The existing bridge opening is 53 feet wide.

Given these restrictions, it was determined that channelization could be used as a supplement to a levee based plan, but channelization alone would offer little improvement in the areas where flood protection was most needed; i.e., near Production Products.

c. Levees and floodwalls serve the same basic purpose; i.e., they contain high levels of water within the channel. Floodwalls, because they occupy less land, are used when space is at a premium. Levees are generally less expensive than floodwalls, and are used whenever there is enough land available. Four plans were developed that combined channelization, levees, and floodwalls.

d. Diversion channels can be used to direct water away from high damage areas when enlargement of the existing channel or placement of levees is undesirable. Because of the nearly complete development in the village a diversion which would bypass the damage areas would be located through areas where existing elevations are much higher than the flood plain. The difference in elevations would make excavation of such a diversion too expensive.

e. Nonstructural Alternatives. A review of the structures and flooding patterns in Manlius indicated that some nonstructural elements should be considered and others were clearly inadvisable. Relocating all the structures in the flood plain was determined to be too costly, but the relocation of Production Products would substantially reduce flooding damages.

The elevation of structures on columns or fill material is more cost-effective in areas where a few structures are widely spaced. In those cases, the costs of containing floodwaters tend to be high, and the damages reduced tend to be low.

In Manlius, structures that can be damaged in flooding are generally well clustered into the Mill Street, Tyler Court, or Westbrook Circle - Brookhill Drive areas.

The buildings which are not tightly clustered, such as Production Products and P&C Foods are too large and/or too low to economically elevate; furthermore, their structural configuration eliminates further consideration of elevation.

3. PRELIMINARY PLANS

Twelve preliminary plans were evaluated, including the alternative of no Federal action.

Briefly, the plans consisted of:

a. Plan 1 began 780 feet upstream of the centerline of the existing Rt. 173 bridge over the Main Branch with a riprapped transition zone and a 7-foot high drop structure. From that drop structure down to a point 530 feet downstream of the bridge, the channel would be excavated to effect a stream gradient of 0.00425-foot per foot, with a typical bottom width of 35 feet and 1 vertical to 2.5 horizontal side slopes. This channel would be lined with riprap. At the downstream end of the 35-foot wide channel, a second drop structure, 5 feet high, would be installed. Downstream of this drop structure, the channel would be excavated to a 90-foot bottom width, extending to a point near the confluence. Because of the increased width and the reduction of velocities by the drop structure, no bank protection would be needed. Levees and floodwalls would be needed to contain the 100-year flood. A levee would extend along the right bank of the Main Branch from Mill Run Park to Tributary 9, except at the Gray-Syracuse Building where a floodwall would be required instead of a levee because of space limitations.

Another levee ran along the left bank of the Main Branch from Thermold Drive to Production Products where a floodwall was used because of space limitations. The levee continued downstream, wrapping around Tyler Court and extending up the right bank of the West Branch past Westbrook Circle.

In addition to the levees, a drainage ditch cut into the left bank of the Main Branch upstream of Thermold Drive would be filled.

b. Plan 1A is the same as Plan 1 except that floodproofing of Mill Street structures would be substituted for the levee on Mill Street. The floodwall at Gray-Syracuse would remain.

c. Plan 1B is the same as Plan 1 except that all structures on the right bank would be floodproofed, and no levees would be required on the right bank. Again, the floodwall at Gray-Syracuse would remain.

d. Plan 2 is the same as Plan 1 in many respects. It has the same levees and floodwalls, and a 7-foot drop structure at the upstream limit of the improvements. The 35-foot bottom width riprapped channel in Plan 2, however, would be used for the entire length of the improvements in the Main Branch, and the 5-foot drop structure of Plan 1 would be omitted.

e. Plan 2A is the same as Plan 2 except that floodproofing of Mill Street structures would be substituted for the levee on Mill Street. The floodwall at Gray-Syracuse would remain.

f. Plan 2B is the same as Plan 2 except that all structures on the right bank would be floodproofed, and no levees would be required on the right bank. The floodwall at Gray-Syracuse would remain.

g. Plan 3 is a channelization plan beginning with a 12-foot drop structure and 75-foot long stilling basin, 1,070 feet upstream of the Route 173 bridge over the Main Branch. From the stilling basin to the bridge, the channel would be excavated to a bottom width of 90 feet with 1 on 3 side slopes at a gradient of 0.0007143-foot per foot. There would be a riprapped transition zone to narrow the channel width as it passed under the bridge. The 90-foot drop structure with a 50-foot wide earthen channel would continue for another 300 feet downstream of the bridge where a 7-foot drop structure with a 50-foot long stilling basin would be constructed. The 90-foot wide earthen channel would continue for another 1,500 feet downstream of the stilling basin, followed by a riprapped transition zone to existing conditions 300 feet upstream of the confluence of the Main and West Branches. The 12-foot drop structure would eliminate the right bank levee from the drop structure to the bridge. Other levees and floodwalls used in Plans 1 and 2 would remain.

h. Plan 4 is based on the use of a fabric formed concrete lined channel rather than the riprapped or unlined channel. Channelization would begin 1,100 feet upstream of the Route 173 bridge. A 50-foot long riprapped channel would provide a transition zone from the existing channel to the concrete lined channel. The concrete lined channel would have a 35-foot bottom width, 1 on 1 side slopes and a gradient of 0.0130-foot per foot from the upstream limit to a point 600 feet upstream of the bridge. The next 1,200 feet of channel would have the same cross section, would be concrete lined, but would have a gradient of 0.0066364-foot per foot. The concrete lined channel would end at a 5-foot drop structure 500 feet downstream of the bridge. The drop structure would have a 50-foot long stilling basin with another 50 feet of riprap lined channel downstream of the basin. The riprapped channel would provide a transition zone to 90-foot wide earthen channel with 1 on 3 side slopes and a gradient of 0.00183-foot per foot. The earthen channel would extend to a point 1,800 feet downstream of the bridge, followed by a riprapped transition to the existing channel just upstream of the confluence of the Main and West Branches. Levees and floodwalls would be used in the same locations as in Plan 1.

i. Plan 5 is the Relocation of Production Products Company (PPC). PPC will suffer the majority of the projected flood damages in Manlius, so relocation of the internal production facilities of the PPC plant was analyzed. Costs include the purchase of the existing plant and land ($465,900) the costs of moving the plant equipment (estimated at $250,000), and the value of lost production during the shutdown period required for relocation (96 days at $8,470/day = $813,000). Total NED costs of relocation are $1,528,900.

Since part of the projected flood damages are already reflected in the lowered market value of the property, only flood related damages borne by the public are included in flood inundation reduction benefits. These include the average annual subsidization of flood damages by the flood insurance program of the Federal Emergency Management Agency (FEMA) ($24,772) and the annual administrative costs associated with the program ($20). Total average annual benefit is $24,800.

Since reimbursement for production losses resulting from relocation are limited to $10,000 by Public Law 91-646, the closing of PPC during relocation of the internal production facilities would create excessive financial burdens for John Mezzalingua, a resident of Manlius since 1905 and sole owner of PPC. Mr. Mezzalingua founded and then sold PPC. He reacquired PPC in February 1981 to prevent the closing of the business during hard times, thus preserving the careers of many of his former employees. Mr. Mezzalingua in a 31 January 1984 letter to the District wrote "Due to the cost and subsequent production downtime, we have determined that it would not be feasible to move Production Products from its present location." (The complete letter is in Appendix F.)

j. Plan 6, the "No Federal Action Plan" was used as the benchmark for comparison with other plans involving Federal action. This plan is simply existing conditions and expected future conditions with no Federal action. For more details on these scenarios, see the previous sections of this report.

k. Plan 7 is the first of the two Pompey Hollow reservoir plans developed to provide regional flood control. Plan 7 includes a dam near Palmer Road and Route 92 (see Figure 5) with a spillway crest elevation of 580 feet and a drainage area of 8 square miles.

Improved discharge-frequency curves for Limestone Creek downstream of the proposed reservoir were calculated based on an elevation-storage relationship for the reservoir. The reservoir itself would not provide 100-year protection along the Main Branch in Manlius, and would not provide any significant change in flooding along the West Branch, so supplemental levees were added where needed to provide a level of protection comparable to Plans 1 through 4.

l. Since the reservoir would provide some relief for the village of Fayetteville, a Plan 8 was created which included a reservoir, levees in Manlius, and levees, channelization, and dam removal in Fayetteville. Thus, Plan 8 provides 100-year protection for both Manlius and Fayetteville. This plan was used to determine whether it would be wiser to pursue regional or local flood control measures in the Limestone basin.

m. Urban flood control projects which include high levees create the potential for catastrophic damage if the levees fail or are over topped. Should one of the levee plans above fail, the village of Manlius would suffer more sudden damage than if there were no levees. Residents, believing that they were protected by the flood control project, could be trapped in their homes as the village quickly filled like a bathtub.

Table 1 - Comparison of Plans in the First Itertion of Plan Formulation
(October 1983 Price Levels, 8-7/8 Percent Interest)

	Plans											
	1	1A	1B	2	2A	2B	3	4	5	6	7	8*
Level of Protection	100-Yr.	100-Yr.	100-Yr.	100-Yr.	100-Yr.	100-Yr.	100-Yr.	100-Yr.	N/A	0	100-Yr.	100-Yr.
First Cost ($)	5,300,000	5,200,000	5,300,000	5,200,000	5,100,000	5,200,000	5,800,000	4,000,000	1,528,900	0	8,000,000	12,000,000
Annual Costs ($)												
Amortized First Cost	477,000	468,000	477,000	468,000	459,000	468,000	522,000	360,000	137,600		720,000	1,080,000
Maintenance	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	0	0	80,000	120,000
Total	527,000	578,000	527,000	518,000	509,000	518,000	572,000	410,000	137,600	0	800,000	1,200,000
Average Annual:												
Benefits ($)	517,300	517,300	517,300	517,300	517,300	517,300	517,300	555,000	24,800	0	517,300	867,000
Net Benefits ($)	-9,700	-700	-9,700	-700	8,300	-9,700	-54,700	145,000	-112,800		-282,700	-333,000
Residual Damages ($)	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	158,410	475,000	30,000	30,000
B/C Ratio	0.98	0.99	0.98	0.99	1.02	0.99	0.90	1.35	0.18	N/A	0.65	0.72
Number of Homes Protected	84	84	84	84	84	84	84	84	0	0	84	270++
Businesses Protected	14	14	14	14	14	14	14	14	1	0	14	47++
Bridges Replaced	0	0	0	0	0	0	0	1	0	0	0	0
Fisheries	-	-	-	-	-	-	-	--	+	0	-	-
Aesthetics	-	-	-	-	-	-	-	-	+	0	-	-
(++ = Improvements)												
(-- = Worsening)												
(0 = Do not Effect)												

+Costs and benefits include 100-year protection for Fayetteville as well as Manlius.

++Approximate

For the reason, the possibility of providing protection from a Standard Project Flood (SPF) was investigated. A Standard Project Flood is the flood which would occur after a rainfall of specific and very rare intensity and duration. The discharge for the Standard Project Flood in Manlius would be 42,600 cfs at the junction of the Main and West Branches, compared to 8,800 cfs for the 100-year flood.

Because the SPF discharge is so high, any plan which would confine the SPF flood would require two new elevated bridges, and levees approximately 8 feet higher than those required for 100-year protection. The additional costs for SPF protection far exceed the additional benefits derived. (See Plan Optimization, page 36). The concern about over topping high levees remained, however, and was addressed in the selection of the recommended plan.

4. ANALYSIS OF PRELIMINARY PLANS

Plans 1, 1A, 1B, 2, 2A, 2B, 3, and 4 provided protection from a 100-year flood on both the Main and West Branches of Limestone Creek in the village of Manlius. Plan 5 provided complete protection for Production Products Company, but no protection for any other part of the village. Plan 7 offered varying degrees of protection on the Main Branch.

Table 1 shows how these plans compare on the economic, environmental, and sociological issues. Plan 1, 1A, 1B, 2, 2A, 2B, 3, 4, and 7 provide 100-year levels of protection along the Main and West Branches.

Plan 4 calls for construction of a new raised Route 173 bridge over the Main Branch, the other plans do not. In the preliminary cost estimate for this plan, a lump sum estimate of $800,000 was made for the single span bridge. Since the construction of Plan 4 would provide a new bridge before it was needed for other reasons, an "advanced bridge replacement benefit" was calculated to capture this supplemental utility. That annual benefit is $37,860 and is applied to Plan 4 only.

The benefits attributed to Plan 5 are the average annual damages that would otherwise be subsidized. These annual benefits total $24,800.

Plan 7 (reservoir supplemented with levees in Manlius to provide 100-year protection) is shown in Table 1, but only the benefits attributable to the village of Manlius are shown. Hydrological analysis indicated that the reservoir would reduce stream discharges in Fayetteville by an average of 25 percent. That would reduce average annual damages in Fayetteville somewhat, but a detailed estimate of that reduction was not made.

Plan 8 would provide 100-year protection for Fayetteville with the reservoir in place. The benefits, costs, and effects of the Fayetteville portion of that plan were not as throughly investigated as the Manlius portion because of time and funding restrictions. Enough detail was provided, however, to make an informed decision to pursue local flood control measures.

Analysis of Table 1 shows that Plan 4 (the concrete channel) is the plan with the maximum net NED benefits.

The analysis of these plans during the first stage of the study indicated that Plan 4 (concrete channel) was the NED plan. Relocation of Production Products (Plan 5) was the only plan which made a net contribution to the EQ account.

It should be noted again that the plans considered during the first iteration of plan formulation are no longer implementable. This is due to the removal of McIntyre Dam as a result of the October 1981 flood, which caused significant change in the hydraulic characteristics of Limestone Creek.

5. PUBLIC INVOLVEMENT

Public hearings on the subject of flood control in Manlius had been held during previous studies. A Public Hearing in January 1962 revealed many of the same concerns by villagers that were expressed during the course of this study. One difference is that in 1962, village residents perceived the Main Branch as the significant flood threat. During the early part of this study, most villagers expressed concern about West Branch flooding, since during the July 1974 flood, significant flood damages were sustained along the West Branch; the Main Branch upstream of the junction point received only minor flood damages.

A public workshop was held on the evening of 8 November 1979 in the village of Manlius Municipal Building. A copy of the proceedings of that meeting is including the Public Involvement Appendix to this report. During the workshop, villagers told the Corps of ice and debris problems at both the Main and West Branch bridges, shoaling over a period of years on the West Branch, and the fact that flooding was a problem upstream and downstream of the village of Manlius. The majority of attendees felt that specific plans should be developed by the Corps before they could comment on solutions.

The first iteration of plan formulation was nearing completion when the Corps held another meeting in Fayetteville, NY, on 12 February 1982. At the time, public feelings were aroused because of the October 1981 flood. The Corps called the meeting for two reasons:

a. to explain the limitations of the Federal Government in responding to flooding problems such as the problem in the Limestone basin.

b. to ask for public reaction to a basic study decision. Initial review of regional flood control plan (Plan 8) indicated that costs for regional flood control would outweigh the benefits, but there was strong support for a reservoir plan among some of the public. Specifically, residents of Minoa and other communities along Limestone Creek with little expectation of local flood control projects, recreational fishermen, and people opposed to the unsightliness of local flood control project supported the reservoir concept.

Colonel George Johnson (Buffalo District Engineer, Corps of Engineers, 1979-1982) presided at the meeting. The meeting was attended by Congressman George C. Wortley, Federal, State, and local officials, and an overflow crowd

of local citizens. Colonel Johnson described the range of actions that he was empowered to take under emergency programs, the Continuing Authority Program, and under specific authorization by Congress. He noted that the reservoir based regional flood control plan could be pursued under the Continuing Authority Program or under a Congressionally authorized study, but preliminary indications were that regional flood control would not be cost justified. At the conclusion of the meeting, all who spoke expressed their support for the pursuit of separate studies for Manlius and Fayetteville under the Continuing Authorities Program.

Another meeting was held on 22 April 1982 in the village of Manlius. This meeting was called by the Corps to present the analysis of the preliminary plans for a local flood project for the village of Manlius. Charles Gilbert, Chief of the Planning Division of the Buffalo District told the attendees that the Corps had studied a broad range of alternatives and intended to begin a more detailed analysis of a plan similar to Plan 4 (1,300 feet concrete lined channel) pending a new hydraulic analysis of Limestone Creek without McIntyre Dam. Noting that the concrete lined channel would eliminate 1,300 feet of trout habitat, Mr. Gilbert said that the Corps might also develop a plan similar to Plan 2A, the least expensive of the riprap channel plans, so that the two approaches could be compared with more precision.

The reactions of the attendees were varied. Some people spoke in support of Plan 4, some for Plan 2A. A representative from the Fayetteville Rod and Gun Club read a statement opposing concrete in the creek. People who lived outside the village who had attended the meeting spoke in support of a regional flood control project. A local engineer who had dealt with confluence losses in heating and air conditioning duct work systems pointed out that the two branches joined at right angles. Because of the right angle geometry and the high velocities on the West Branch, he argued, the discharge from the West Branch would reduce the effective cross sectional area for the Main Branch, causing higher Main Branch water surfaces. He suggested that the confluence be reshaped into an acute angle to lessen this effect. A transcript of this meeting was made.

The attendance and reactions at these meetings demonstrated the great public concern over flood damage, safety during floods, aesthetics of flood control works, flood control outside the village, and erosion control. The greatest concern with the plan that had been identified as the NED plan was that it would destroy a portion of a highly valued trout stream.

ALTERNATIVE PLANS DEVELOPED AFTER THE MCINTYRE DAM WAS REMOVED

1. NEW CONSIDERATIONS

The plan formulation and assessment procedure detailed in the previous section of this report was based on the presumption that the McIntyre Dam, which was damaged in the July 1974 flood, would be repaired. Bids on the work required to repair the dam were opened on 9 October 1981. The lowest bid was $47,000 above the $100,000 that had been allocated for the job by New York State. Revised specifications were being prepared when the 28 October 1981 flood caused substantial additional damage to the dam and the property near the dam.

A new contract was awarded in December to remove what remained of the dam. In July 1982, the topography which had been changed by the flood and subsequent dam removal was resurveyed. A new computer analysis calculated water surface elevations and water velocities along Limestone Creek for flooding events of several recurrence intervals.

The computer analysis indicated that removal of the dam reduced water surface elevations for the 100-year flood 5-1/2 feet at the dam site and 1 foot at the confluence at the Main and West Branches. The effect of the dam removal ends completely at the upstream end of Tyler Court (1,000 feet upstream of the confluence) on the Main Branch, and at the Route 173 bridge on the West Branch. Velocities in the downstream areas increased substantially.

The loss of the dam required two basic modifications to the plans that had been recommended during the first iteration of plan formulation:

a. Levees around Tyler Court could be reduced in height by 0 to 1 foot.

b. The lower section of the improved channel would need to be protected from the erosive force of the higher velocity water.

Plans 1, 1A, 1B, 3, and 4 would require riprap along the banks of the earthen channel section located between Production Products and the confluences. This would increase the costs of those plans by approximately $2,300,000. The size of riprap would have to be increased in Plan 2, 2A, and 2B to counter the increased velocities in the lower range. The larger riprap in the lower section of the job would increase the costs of those plans by $800,000. With these additional costs, only Plan 4, the concrete channel plan, would be economically viable. The revised Plan 4 would cost $6.3 million, with an annual cost of $630,000. The B/C ratio would be 0.81.

However, in addition to the additional costs for these plans, another factor became important. Local protection measures implemented just before the 1981 flood had reduced the potential for damage in the upstream industrial park. In fact, no damages had been reported for that area during the October 1981 flood. Reduced damage could also be expected in the Tyler Court and lower West Branch area because of the dam removal. Quantification of these effects later in the study verified that the reduced benefits made even Plan 4 economically unfeasible.

2. APPLICABILITY OF PRE-FLOOD INVESTIGATIONS

Some of the plan formulation work done before the October 1981 flood was still useful and reduced the post flood analysis required. Physical changes in the upstream portion of the Main Banch caused by the flood and post flood construction reduced potential damages, and reduced construction requirements to some degree. The levee at Production Products was destroyed and rebuilt to about the same specifications. The downstream areas had higher velocities and lower water surfaces. The net result was that some of the pre-flood plan formulation for the portion of the Main Branch upstream of Production Products could be used in post-flood analysis. The levee for the West Branch was now certainly not cost-justified. None of the previous designs for the lower portion of the Main Branch was cost-effective in the post-flood situation.

3. INITIAL RECOMMENDATION

A new plan was developed, based on post-flood information and the pre-flood work which was still valid. The new plan, Plan 9, called for a 2,900-foot long fabric formed concrete lining in the Main Branch, beginning 500 feet upstream of the Route 173 bridge, ending at the confluence of the Main and West Branches. The channel would have a typical bottom width of 35 feet. The confluence would be realigned into an acute angle and stabilized by a fabric formed concrete lining. That lining would extend up the West Branch for a distance of 400 feet. A 440-foot transition zone from the concrete-lined confluence to the unimproved channel downstream of the confluence would be lined with 18-inch riprap.

Because channel surfaces lined with fabric formed concrete are smoother than channel surfaces lined with riprap, and because channel bottom elevations over the length of the project changed more than in any of the previous plans, stream velocities for Plan 9 would be much higher than for the previous plans. The higher velocities in Plan 9 lowered water surface elevations, which eliminated the need for levees. To dissipate the erosive energy associated with those higher velocities, a hydraulic jump was designed into the fabric formed concrete-lined channel about 600 feet upstream of the confluence.

Because there would be no levees or drop structures, and because of the reduction in improved channel length above Route 173, the estimated cost for Plan 9 was $3.7 million, a substantial reduction from previous plans.

4. PUBLIC INVOLVEMENT

A meeting was held on 1 December 1982 at the Cortland, NY, office of NYSDEC to present the new proposal to interested Federal, State, and local officials. Representatives of Trout Unlimited and the Fayetteville - Manlius Rod and Gun Club also attended.

After presentation of the plan, a discussion of the effects of the concrete lining on trout feeding and spawning ensued. It was the feeling of NYSDEC, USF&WS, and the sportsmen clubs that the concrete lining would eliminate a substantial portion of the feed supply for trout, and those groups strongly objected to the new plan on that basis.

Russel Wege, NYSDEC, suggested that a high flow only diversion, parallel to the natural channel near Tyler Court, and lined with concrete, could provide the required flood control and at the same time preserve a substantial portion of the natural creek bottom essential for food supply.

It was generally agreed by the participants of the meeting that such a plan would be acceptable. For the purposes of this report, the diversion alternative plan will be referred to as Plan 10.

Table 2
(January 1987 Price Levels, 8-7/8 Percent Interest)

Plan	5 Relocation of PPC	6 No Action	10 Diversion
Level of Protection	N/A	None	100 yr.
First Cost:	1,594,000	0	3,764,000
Annual Cost: Amortized First Cost	143,460	0	325,530
Maintenance	0	0	36,170
Total	143,460	0	361,700
Average Annual: Benefits	24,800	0	523,240
Net Benefits	-118,660	0	161,540
Residual Damages	165,000	530,500	51,000
B/C Ratio	0.17	N/A	1.45
Number of:			
Homes Protected	0	0	46
Businesses Protected	1	0	4
Public Buildings Protected	0	0	2
Bridge replaced?	No	No	Yes
Local Share Implementable?	No	N/A	Yes
Effect On: Fisheries	+	0	-
Aesthetics	+	0	0
Health & Safety	+	0	++

++ = Great Improvement
-- = Great Worsening
0 = No Net Effect

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PLAN SELECTION

The long, two-stage plan formulation process reduced the number of options worthy of consideration to three:

- Plan 5 - Relocation of Production Products, Inc. The only plan that made a net contribution to the EQ account.

- Plan 6 - No further Federal involvement.

- Plan 10 - A concrete lined channel with a diversion behind Tyler Court. This plan maximizes net NED benefits.

Table 2 compares the three plans according to the same parameters displayed in Table 1, using the post-flood benefit predictions and current price levels.

Plan 10 has substantial net NED benefits and a strong benefit to cost ratio. Plan 10 produces benefits from the protection of PPC and the avoidance of lost income that would result from the shutdown of that company during and after major floods. In addition, it protects 46 homes, three other businesses, and two public buildings. The new Route 173 Bridge required for Plan 10 would replace an existing bridge built in 1920; thus, construction of the new bridge benefits the Nation and community not only by aiding in flood control but by replacing an aging bridge.

Plan 10 (the fabric formed concrete lined channel and diversion) would eliminate about 1,200 feet of natural channel which would change the visual aesthetics of the creek and reduce the feeding habitat for trout. Visually, the natural look of overgrown and irregular streambanks of varied composition (gravel, shrubs, erect and fallen trees, natural and man-made debris, grass, and exposed soil) would be replaced by a geometrically regular channel of concrete and grass. At the present time there are trees, fallen trees, shrubbery, irregular drainage channels and swales, debris, exposed soil, and grassy areas behind Tyler Court. The diversion in Plan 10 would occupy a strip of land about 100 feet wide and 1,315 feet long. The plan calls for additional stripping, grading, and grass seeding on both sides of the diversion. The island between the diversion and the natural channel would be relatively open, as it is now. Existing vegetation along the north edge of the island would be preserved when possible. Trees would be planted where necessary along this edge to increase shading of the natural channel.

Relocation of Production Products (Plan 5) could create new access to Limestone Creek for sports fishermen, and could add to the beauty and quiet of the village. Plan 5 would reduce health and safety hazards for the workers in Production Products, but would not reduce the hazard to health and safety throughout the rest of the village.

The annual benefits attributable to Plan 5 are less than the annual costs, and there are large costs which would be borne by PPC. Mr. John Mezzalingua, President of Production Products, has indicated to the Corps that he could not afford the expense of relocation. His alternative without any further Federal action is to depend on the protection provided by his levee/floodwall

for events with a recurrence interval of 5 years or less, and to purchase flood insurance to compensate for the damage from larger floods. Present flood insurance rates for his company are substantially less than the estimated average annual damages for his company under existing conditions. As a result, Plan 5 would not be implemented because Mr. Mezzalingua could not afford the estimated losses in revenue.

The evaluation of the three identified alternatives shows that Plan 10 should be the recommended plan. It is the most cost efficient of all the plans. Because there are no levees in Plan 10, the risk of an induced catastrophe during floods greater than the design flood is eliminated. Plan 5 is not cost efficient, and cannot be implemented because of the hardship that would be imposed on PPC.

DESCRIPTION OF THE SELECTED PLAN

a. Plan Components. Cross sections, stream profiles, and design calculations for the Selected Plan (Plan 10) can be found in the Design and Hydraulics Appendices to this report. This section provides a general description of the selected plan. Figure 7 shows design features in a plan view.

Plan 10 would provide sufficient channel capacity within the village to contain a 100-year flood on the Main Branch of Limestone Creek. That capacity would be produced by excavation in the natural channel, excavation of a 1,315-foot long diversion behind Tyler Court, and the installation of a fabric formed concrete lining in the diversion and the natural channel above and below the diversion. The natural channel parallel to the diversion (hereafter called the riprap channel) would be stabilized against erosion by the placement of riprap on the channel side slopes. The bottom of the riprap channel would be excavated so that it would carry all flows less than 300-400 cfs. Riprap and concrete blocks would be placed in the bottom of the riprap channel to create a diverse habitat for trout. Tributary 9, which presently joins the Main Branch near Production Products, would be rerouted so that it would flow into the riprap natural channel rather the concrete lined channel. This rerouting assures that the tributary will continue to be used for spawning and for protection of fry from cannibalistic older trout. The last 60 feet of the rerouted tributary would be channeled through a rectangular culvert because of the limited amount of land available in the area.

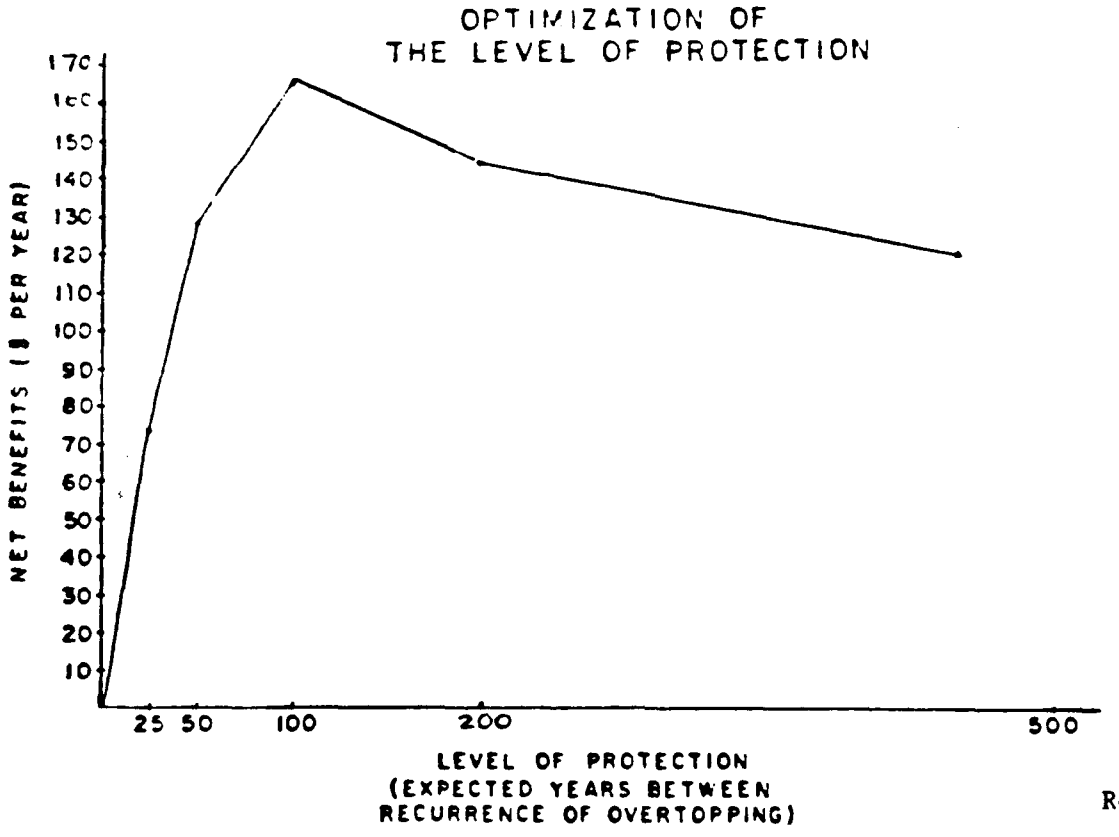
In order to maintain the best possible trout habitat in the riprap channel, a 2-foot high weir would be placed across the upstream end of the diversion. The weir, in conjunction with the aforementioned excavation in the riprap channel, would assure that all flows up to about 300-400 cfs would be directed through the riprap channel. During the project design flood, about 2,500 cfs would be directed through the riprap channel and 4,000 cfs would pass through the diversion. Flows entering the riprap channel would be limited by a reinforced concrete control structure with a rectangular opening 20 feet wide.

A hydraulic jump would be induced near the lower end of the diversion which would reduce velocities and raise the water surface elevation. The jump and the widened channel downstream of the three way junction (the riprap channel, the West Branch and the diversion channel) would assure that water velocities and depths would be the same downstream of the village as they would have been without the project.

A new Route 173 Bridge over the Main Branch would be constructed by the New York State Department of Transportation. The existing bridge has a restrictive concrete arch opening. The new bridge would have a clear span over the new channel, which has a 35-foot bottom width with 1 vertical per 2.5 horizontal side slopes. Because of the new channel configuration and the higher velocities associated with the increased stream gradient and concrete lining, the new bridge would have the same low concrete elevation as the old top of arch elevation. The bridge deck could be installed at the same elevation as the existing deck.

Finally, the confluence of the three channels - riprap channel, diversion, and the West Branch - would be reinforced with fabric formed concrete lining. The lining would extend 200 feet up the riprap channel and the West Branch. Transition zones at the upstream and downstream ends of all improved channels would be lined with riprap.

b. Plan Optimization. Federal regulations stipulate that the recommended plan must be sized so that the difference between average annual costs and benefits (called "net benefits") is maximized. Average annual benefits and costs were calculated for concrete lined channel and diversion plans that would eliminate flooding damages caused by four different discharges. The five discharges (4550, 5500, 6500, 7600, and 9160 cubic feet per second) correspond to events which can be expected to happen, on the average, every 25, 50, 100, 200, and 500 years, respectively. The plan which protects against a 25 year discharge is the least expensive. However, because floods larger than the 25 year flood will still cause damage, that plan also has the lowest average annual benefits. The graph below compares the net benefits to the size of the plan, measured by the size of the flood it protects against. Because net benefits peak at a design which protects against a 100 year flood, that level of protection was selected for the recommended plan.



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c. Real Estate Required. Rights to a total of 10.46 acres of unimproved land would be acquired, including permanent easements on the land used for the project. Temporary work easements around the project area would be acquired for the period of construction. Land located between the diversion and the Main Branch would be acquired outright since there would be no land access to it. One residence and a warehouse would be purchased because they are in the path of the new channel. Another residence would be purchased to provide access for maintenance to the project. Costs for real estate are listed in Table 4 and again in Table 7. A complete real estate report is Appendix F to this report.

d. Design and Construction Considerations. Fabric formed concrete linings are less expensive and easier to install than traditional wood formed concrete linings. Two layers of fabric are attached by regularly spaced tether cords whose length determines the form thickness. Pieces of fabric are sewn together in the field to form a continuum. The fabric is placed from bank to bank and grout is pumped between the two layers of fabric. An essential point is that the entire operation can be performed without diverting the creek. Because of concern expressed by USF&WS, the creek will be monitored during grout pumping to assure that the pH of the creek water is not unduly disturbed by grout which escapes the fabric form.

The main stem of Limestone Creek is to be excavated from the junction of the upstream end of the diversion and Limestone Creek, downstream to just below the confluence of Limestone Creek and the West Branch of Limestone Creek.

Slopes of 1 vertical on 2.5 horizontal are used for this report. Limestone Creek will be riprapped from just downstream of the confluence to the downstream terminus of the project. Material excavated from the upstream natural channel and the diversion would be used for compacted fill. The balance of the fill material would be used to grade the areas on each side of the diversion and a small area adjacent to the Main Branch and the Route 173 bridge. Excess fill material (if any) would be transported to NYSDEC approved disposal sites. Field investigations and coordination with other agencies indicates that the excavated soil will be clean fill material.

Excavation through soil will be required to construct most of the project elements. No rock excavation is anticipated. With proper slopes and adequate bedding material no construction problems are invisioned in placing the fabric formed concrete. Similarly, no construction problems are anticipated in connection with riprap placement.

Construction of the control structure at the junction of Limestone Creek and the upstream end of the diversion channel is likely to require minor diversion of Limestone Creek, but it should not be necessary to divert the creek outside of its existing banks.

e. Operation and Maintenance Considerations. The control structure, which would divert all flows up to 300-400 cfs into the riprap channel and split flows greater than 300-400 cfs between the riprap channel and the diversion, has been designed with no moving parts. Flow direction is effected automatically, and is governed by the diversion weir height (2 feet) and the 20-foot wide rectangular opening to the riprap natural channel. The new bridge would require less maintenance than the concrete arch bridge, built in 1920, which it would replace.

Preliminary sedimentation analyses indicate that significant quantities of sediment are moved within the project limits. The proposed deepening and

widening of the channel will create a settling basin within these limits. Periodic dredging will be required to maintain the new hydraulic conditions.

Deposition may also occur at the confluence of the diversion channel as a result of the decrease in flow and may also require maintenance dredging. Assessment of the effect of the heavy bedload on the fabric formed concrete lining included in Appendix C.

The riprap and concrete blocks removed from areas of the creek where the concrete lining will be installed will be used to line the bottom and sides of the riprap channel. Because more riprap is available than will be needed for construction, the surplus stone will be stored adjacent to the project area on land acquired by the State for that purpose.

f. Environmental Considerations. Coordination with U.S. Fish and Wildlife Service and NYSDEC during the development of the recommended plan produced a number of suggestions included in the final design, including the diversion itself. The Fish and Wildlife Coordination Act Report is included in the Environmental Impact Statement immediately following this report.

In addition to the design features already mentioned (such as the diversion, the placement of stone in the riprapped channel, etc.) U.S. Fish and Wildlife made the following recommendations in the Coordination Act Report:

1. "To mitigate fish losses and assure continued free movement of fish within the area influenced by the project, the passage in the control weir and the final low flow channel configuration should be designed in cooperation with and approved by the NYSDEC, USFWS, and USEPA.

Response: Concur. Project features have been and will continue to be coordinated with USFWS, NYSDEC, and USEPA. Plan descriptions in the DPR and EIS describe measures for this purpose. The Project Environmental Scheme included in the Environmental Appendices which follows the EIS also identifies such measures. More specific details will be coordinated during preparation of Plans and Specifications to develop a design acceptable to all. The technical right to approve Corps projects and their features is vested in the Secretary of the Army. The local cooperator, in this case NYSDEC, has the option to withdraw support if the project contains unacceptable features.

2. "To minimize the amount of project caused erosion, siltation, and water pollution during and immediately after construction, a plan should be developed in cooperation with and approved by NYSDEC, USEPA, and USSCS."

Response: Concur, with the technical exception on the point of approval authority, as noted in the first response. Agencies listed are invited to provide input for the project to reduce erosion, siltation, and water pollution during construction. This is usually addressed in preparation of Plans and Specifications. The contractor will need to comply with Civil Works Construction Guide Specifications - Environmental Protection (CW-01930 July 1978). An extract from this document pertaining to erosion and siltation protection is included in the Environmental Appendices which follows the EIS. More specific details will be coordinated during the preparation of Plans and Specifications.

3. "To minimize the loss of fish and/or aquatic organisms, the fabric formed concrete should be constructed in the dry where possible, and when this is not possible, construction should begin at the downstream end to allow the greatest dilution possible to occur over a disturbed bottom. Initial pumping of the concrete grout should be closely monitored by the USACOE in coordination with the NYSDEC and USFWS."

Response: Concur. Such measures are discussed in correspondence and are included in DPR and EIS plan descriptions. These measures will continue to be coordinated and incorporated into project plans and specifications.

4. "To mitigate both fish and wildlife losses, destruction and/or alteration of both riparian and terrestrial vegetation should be avoided during construction. A revegetation plan should be developed for the project in cooperation with and approved by the NYSDEC and USFWS. The plan should include provisions for monitoring growth to ascertain successful revegetation."

Response: Concur. Construction of the enlarged and fabric formed concrete lined channel and diversion will require substantial stripping and excavation. However, destruction of riparian and terrestrial vegetation will be minimized during construction to the extent possible: particularly along the southern and/or western embankments. The Project Environmental Scheme included in the Environmental Appendices which follows the EIS identifies some significant vegetation retention and/or vegetation areas. More specific details will be coordinated during preparation of Plans and Specifications. Monitoring of the vegetation areas will be added as an item of the local cooperation agreement.

5. "To mitigate losses of fish and wildlife habitat:

(1) the resulting island between the diversion channel and the Main Branch should be dedicated to parkland or to a natural area and vegetated accordingly;

(2) a narrow band of riparian vegetation, preferably the existing, should be maintained along the North edge of the above island;

(3) the parcel next to the West Branch should be dedicated to parkland or a natural area and vegetated accordingly; and

(4) fishermen access should be provided within the area influenced by the project.

5(1) Response: Concur. The resulting island between the diversion channel and the main branch will be purchased as part of project lands and utilized in part for project access and maintenance. It will be maintained as a semi-natural area.

5(2) Response: Concur. Compliance will be through vegetation retention, where possible; or revegetation. The response to Comment 4 also addresses this issue.

5(3) and 5(4) Response: Concur. Riparian vegetation is to remain intact. Access for maintenance will be provided by purchase of property on the right bank of the West Branch immediately downstream of the Route 173 bridge. (187 W. Seneca St). The access route will provide informal fisherman access to the project area.

6. "Future fisheries studies, funded by the project at a cost of $12,000, should be undertaken to determine the success or failure of measures provided in the final project plan, particularly as they relate to fish passage. The studies should be conducted by FWS in cooperation with NYSDEC."

Response: The monitoring study cannot be financed through continuing authorities project funds. This type of study would need to be pursued through the Corps' research and development (R&D) program to evaluate measures under controlled conditions. The Buffalo District feels that the proposed project will not significantly affect trout passage through the project area. This assessment is based on professional opinion formulated from the engineering information provided regarding expected conditions and water flows that would pass through the project site when the flood control measures are installed. However, monitoring and evaluation of measures used at the project would be of value in determining the advisability of similar measures in future similar type situations. Therefore, the Buffalo District will recommend that such studies be considered under the R&D program. This request however, may not be approved by higher authority.

Representatives from the Corps and NYSDEC will meet annually to inspect the completed project. Since NYSDEC is also involved in monitoring fisheries, these routine coordinations should provide sufficient assessment of the success or failure of these measures.

7. "To mitigate for fish losses caused by the placement of 1,175 feet of fabric formed concrete in the main stream of Limestone Creek, stream improvement structures should be constructed in the disturbed natural channel opposite the fabric formed concrete diversion channel. Design should be made in cooperation with New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service. Estimated cost is approximately $10,000."

Response: Concur. The plan agreed to in previous meetings was riprap protection and the random placement of large stone or blocks previously used for bank stabilization nearby in the natural channel to create low-flow channels, riffles, and pooled resting areas for trout. Plan descriptions in the DPR and EIS describe measures for this purpose. The Project Environmental Scheme in the Environmental Appendix also notes such measures. More specific details will be coordinated during preparation of Plans and Specifications. Construction costs for implementation of measures in the middle reach of the disturbed natural channel is estimated to be $3,000 by the Corps. Reference 23 August 1983 Memorandum from NYSDEC in Appendix F of the EIS.

g. Economic Analysis. The itemized cost estimate for the selected plan is shown in Table 3.

Table 4 is a summary of costs on an annual basis. Table 5 lists the average annual benefits by category. Table 6 compares the costs and benefits of the selected plan in three measures of economic efficiency: the ratio of benefits to cost, the difference between annual benefits and annual costs (net benefits), and the number of years required for the benefits of the project to pay for the project costs.

Table 3 - Itemized Cost Estimate for the Recommended Plan
(January 1987 Price Levels)

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
				$	$
	Federal Costs				
1	Clearing and Grubbing	9	Acre	5,000.00	45,000
2	Demolition of Structures	-	L.S.	-	65,000
3	Channels				
	(a) Excavation	64,000	C.Y.	7.65	489,600
	(b) Compacted Fill	5,350	C.Y.	2.55	13,650
	(c) 8" GFEP w/6" Bedding	14,550	S.Y.	37.25	541,990
	(d) 8" GFEP w/0 Bedding	11,800	S.Y.	31.15	367,570
	(e) Reused 18" Riprap	1,150	Ton	18.90	21,735
	(f) 12" Riprap w/6" Bedding	8,800	S.Y.	23.00	202,400
4	SSP Control Structure				
	(a) PZ-22 Steel Sheet Piling	4,451	S.F.	14.35	63,870
	(b) Wales	4,900	LB.	1.35	6,615
	(c) Compacted Fill	750	C.Y.	2.50	1,875
5	3' X 3' Box Culvert w/Headwall	-	L.S.	-	10,000
6	Control of Water	-	L.S.	-	50,000
7	Fertilizing Seeding & Mulching	3	Acre	4,600.00	13,800
8	Total Contractor's Earnings				1,893,105
9	Contingencies at 20% ±				378,795
10	Total Contractor's Earnings Plus Contingencies				2,271,900

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Table 3 - Itemized Cost Estimate for the Recommended Plan (Cont'd)
(January 1987 Price Levels)

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
				$	$
11	Engineering and Design				155,000
12	Supervision and Administration				260,000
13	Subtotal				2,686,900
14	Construction of a New Route 173 Bridge, Including Utility Relocations	-	Lump Sum	500,000(1)	500,000
15	Land Acquisition for Construction, Maintenance, and Operation (4)	10.5	Acre		110,300
16	Purchase of existing Storage Garage at Production Products (4)	-	Lump Sum(2)		44,400
17	Acquisition of 122 West Seneca Street (4)	-	Lump Sum	-	33,600
18	Acquisition of 187 West Seneca Street (4)	-	Lump Sum	-	46,800
19	Relocation Costs as Per Public Law 91-646	2	Resi-dences	15,000	30,000
20	Interest During Construction (3)				165,000
21	Total First Costs				3,617,000

(1) Provided by New York State Department of Transportation.
(2) See Appendix E for details.
(3) Based on a 13-month construction period at 8-7/8 percent interest.
(4) Including a 20 percent contingency factor.

Table 4 - Average Annual Costs
(January 1987 Price Levels and 8-7/8 Percent Interest Rates)

Item No.	Item	Annual Charges
1	Project Costs, amortized (.09 X First Costs)	325,530
2	Maintenance (1 Percent of First Costs)	36,170
3	Total Annual Costs	361,700

Table 5 - Average Annual Benefits
(January 1987 Price Levels and 8-7/8 Percent Interest Rate)

Item No.	Item	Annual Benefit
	Existing:	
1	Flood Inundation Reduction	385,000
2	Income Loss Prevented	94,500
3	Flood Insurance Savings	1,000
4	Advanced Bridge Replacement	40,940
	Future:	
5	Residential Affluence	1,800
6	Total Benefits	523,240

Table 6 - Economic Efficiency

Total Project Costs	Average Annual Costs	Average Annual Benefits	B/C Ratio	Net Benefits	Payback Period
3,764,000	361,700	523,240	1.45	161,540	7 years

h. Compliance with Executive Orders. The recommended plan is in compliance with the executive orders listed under "Planning Constraints":

Executive Order 11988, 24 May 1977, Flood Plain Management. The village currently restricts building in the area flooded by the 100 year flood, as required by flood insurance regulations. With the recommended plan in place, the 100 year flood on the Main Branch will be contained within the banks of the natural and diversion channel. That means that the village could allow development in the 100 year floodplain and still meet the requirements for flood insurance.

If the village allows development in the 100 year floodplain, however, damages from a very rare flood (much greater than the 100 year flood) would be greater than if no further development is allowed. In addition, if development in the floodplain is allowed after the project is completed, then it is likely that the village will be in the same position in 2030 that it is faced with now; forced to build and maintain a concrete channel to avoid heavy economic losses.

Finally, if the village allows development, then the recommended plan would violate Executive Order 11988 by directly or indirectly inducing growth in the floodplain.

For all of the reasons above, the local cooperation agreement must stipulate that the village will continue current building restrictions for the existing 100 year floodplain.

Executive Order 11990, 24 May 1977, Protection of Wetlands. There will be no adverse impacts to wetlands as a result of the recommended plan.

Executive Order 12372, 14 July 1982, Intergovernmental Review of Federal Programs. Due to the complexities of this study, all levels of government have been involved in plan formulation. Compliance with this order will be continued through review of this report by the Director of the Budget, New York State Clearinghouse, and the local cooperator, the New York State Department of Environmental Conservation.

COST SHARING

The estimated Federal and non-Federal distribution of costs for the selected plan are shown in Table 7. These costs are shared in accordance with the rules of the Water Resources Development Act of 1986, Public Law (PL 99-662). That law states that the non-Federal contribution must meet three requirements. First, the law continues the requirement that the non-Federal sponsor of a Federal flood control project must provide all lands, easements, rights-of-way, and relocations (LERR) necessary for project construction. Second, PL 99-662 requires the non-Federal sponsor to make a cash contribution of at least 5 percent of total construction costs. Finally, the law requires that the combined value of the LERR and cash contributed be a minimum of 25 percent of total construction costs. Thus, if the value of LERR is less than 20 percent of total construction costs, the cash contribution required will be more than 5 percent.

Table 7 - Cost Sharing

	$
Value of Lands, Easements, Rights-of-Way	110,300
122 West Seneca Street	33,600
187 West Seneca Street	46,800
Production Products Storage Garage	44,400
Relocation costs for residents of 122 W. Seneca St.	15,000
Relocation costs for residents of 187 W. Seneca St.	15,000
Cost of New Route 173 Bridge, including utility relocations	500,000
Total costs of items required of non-Federal sponsor	765,100
Cash Contribution Calculations	
Equation (1)	
25 percent of total construction costs	904,250
Value of LERR (above)	765,100
Difference (25% - LERR)	139,150
Equation (2)	
5 percent of total construction costs	180,850

PL 99-662 requires that the cash contribution of the non-Federal sponsor be a minimum of 5 percent of the total construction. In this case, that means that the estimated non-Federal cash contribution is $180,850. Since the costs of the LERR are in excess of 20 percent of the total construction cost, additional cash contribution over the minimum 5 percent will not be required.

Value of LERR	765,100
Cash contribution	180,850
Total non-Federal cost share	945,950
Total Federal Costs	2,671,050

In this case, the non-Federal sponsor (NYSDEC) is required to provide the lands necessary for construction and must construct the new Route 173 bridge over the Main Branch Limestone Creek. The estimated value for these items is $765,100, which includes $500,000 for the new bridge, $110,300 for undeveloped lands, $33,600 to acquire 122 West Seneca Street and $44,400 to acquire the storage garage at Production Products (the new channel is routed through both structures), $46,800 to acquire 187 West Seneca Street (that property will be used to provide fisherman access to the project) and relocation costs for the residents 122 and 187 West Seneca (estimated at $15,000 apiece).

Table 7 shows that the difference between 25 percent of total construction costs and the value of LERR is estimated to be $139,150 and that 5 percent of total construction costs is estimated to be $180,850. Thus, the non-Federal cash contribution is $180,850. The total non-Federal share for this project is currently estimated to be $945,950. Final cost sharing cannot be calculated until the actual costs of construction contracts and land acquisition are known.

IMPLEMENTATION OF THE RECOMMENDED PLAN

The Federal government will design and construct all elements of the selected plan except for the new Route 173 Bridge over the Main Branch. That bridge will be designed and constructed by the New York State Department of Transporation with channel features and requirements supplied by the Corps.

Under Section 205 Authority, as amended, Federal expenditure for this project is limited to a maximum of $5,000,000. Federal costs include costs for excavation and filling, the diversion/control structure, removal of the existing bridge, purchase, and installation of the fabric formed concrete lining and purchase and installation of riprap used throughout the project except in the riprap channel. Riprap and concrete blocks for the riprap channel will be provided by the village of Manlius from the existing bank protection.

The New York State Department of Environmental Conservation will be required to enter into a local cooperation agreement with the Federal government. This agreement is required by the Corps of Engineers for local flood protection projects prior to start of construction in accordance with Section 221 of the Flood Control Act of 1970. A list of the responsibilities of the local cooperator is included in the RECOMMENDATIONS section of this report.

Periodic inspections of the completed project will be made jointly by the Corps and State representatives. Inspectors will examine:

a. The integrity of the diversion control structure and fabric formed concrete lining;

b. The amount of sedimentation in the project area;

c. The condition of the riprap areas;

d. The condition of project area grass;

e. Stability of the rerouted tributary.

f. Growth, health, and maintenance of the shade trees and other vegetation.

The NYSDEC will be responsible for maintenance of the above items, including periodic sediment removal if required.

SUMMARY OF PUBLIC RESPONSE

Flood control in the village of Manlius has been a topic of great public concern since the devastating flood of October 1981. In public meetings on 8 November 1979, 12 February, and 22 April 1982 several points were made consistently by the residents of the Limestone Basin:

a. Flooding and erosion along the Main and West Branches of Limestone Creek have exacted a financial and emotional toll from the residents and businesses along the creek.

b. There is no consesus on a remedy. The public is generally divided by self interest: village residents want some type of local protection; residents of less densely populated areas of the basin want a regional flood control reservoir system; fishermen believe that the remedy for flooding should not destroy the fisheries resource and natural beauty of the creek.

c. Those who expressed concern about the effect of flood control on the natural environment held a variety of opinions about what should be done. Some believed that structural flood control was a legitimate response to the flooding problem provided the damage to the natural environment was minimized and mitigated. Others believed that past development along Limestone Creek was ill advised, and reconstruction of the creek to assure the safety of the development was illogical. They argued for a reversal of the development trends.

The primary motivation for this study and any recommendations made on the basis of this study is the development of the national economy. It is felt that all viewpoints presented in meetings and correspondence on this subject have been addressed in this report. The selected plan has the acceptance of NYSDEC, USF&WS, and the village of Manlius.

RECOMMENDATIONS

Based upon the study findings outlined in this report, I recommend that Plan 10 be implemented provided that, prior to construction NYSDEC provides assurances satisfactory to the Chief of Engineers that they will:

a. Provide, during the period of construction, all lands, easements, rights-of-way, and utility and facility alterations and relocations required for construction of the project, regardless of their value;

b. Provide a cash payment of not less than 5 percent of total project costs during the period of construction, regardless of the value of the items in (a) above, except that the combined values of the items in (a) above and the cash payment shall not exceed 50 percent of total project costs;

c. If the value of the items in (a) above is less than 20 percent of total project costs, then provide, during the period of construction, such additional cash payments as are necessary to bring its total contribution in cash and the value of lands, easements, rights-of-way, and utility and facility alterations and relocations to an amount equal to 25 percent of total project costs;

g. Assume full responsibility for all project costs in excess of the Federal statutory cost limitation of $5,000,000.

e. Hold and save the United States free from damages due to construction and maintenance of the project except damages due to the fault or negligence of the United States or its Contractors.

f. Maintain and operate the project, or integral parts thereof, after completion in accordance with regulations prescribed by the Secretary of the Army.

g. Prescribe and enforce regulations to prevent obstruction or encroachment that would interfere with proper functioning or maintenance and operation of the project.

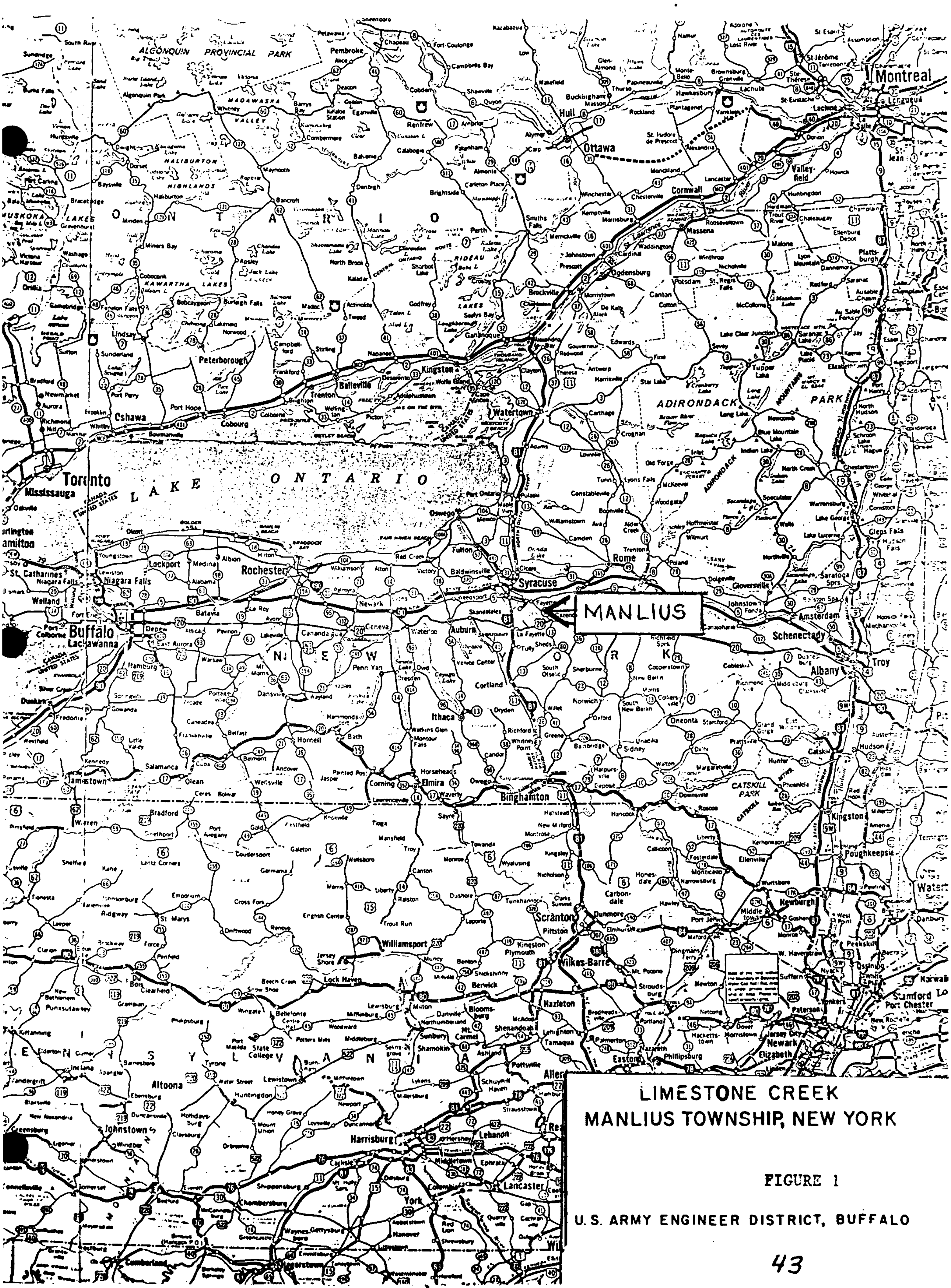
h. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, approved 2 January 1971, in acquiring lands, easements, and rights-of-way for construction and subsequent maintenance of the project and inform affected persons of pertinent benefits, policies, and procedures in connection with said act.

i. Comply with Section 601 of Title VI of the Civil Rights Act of 1964 (P.L. 880352) and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations, in connection with the maintenance and operation of the project.

j. Provide, without cost to the United States, a new Route 173 Bridge over the Main Branch of Limestone Creek which provides 11 feet of under clearance (low steel to improved channel bottom) and 80 feet of clear opening measured perpendicular to the centerline of the project channel.

k. Require the village of Manlius to enforce existing restrictions on development within the area that would be flooded by a 100 year flood without the project.

DANIEL R. CLARK
Colonel, Corps of Engineers
District Engineer



LIMESTONE CREEK
MANLIUS TOWNSHIP, NEW YORK

FIGURE 1

U.S. ARMY ENGINEER DISTRICT, BUFFALO

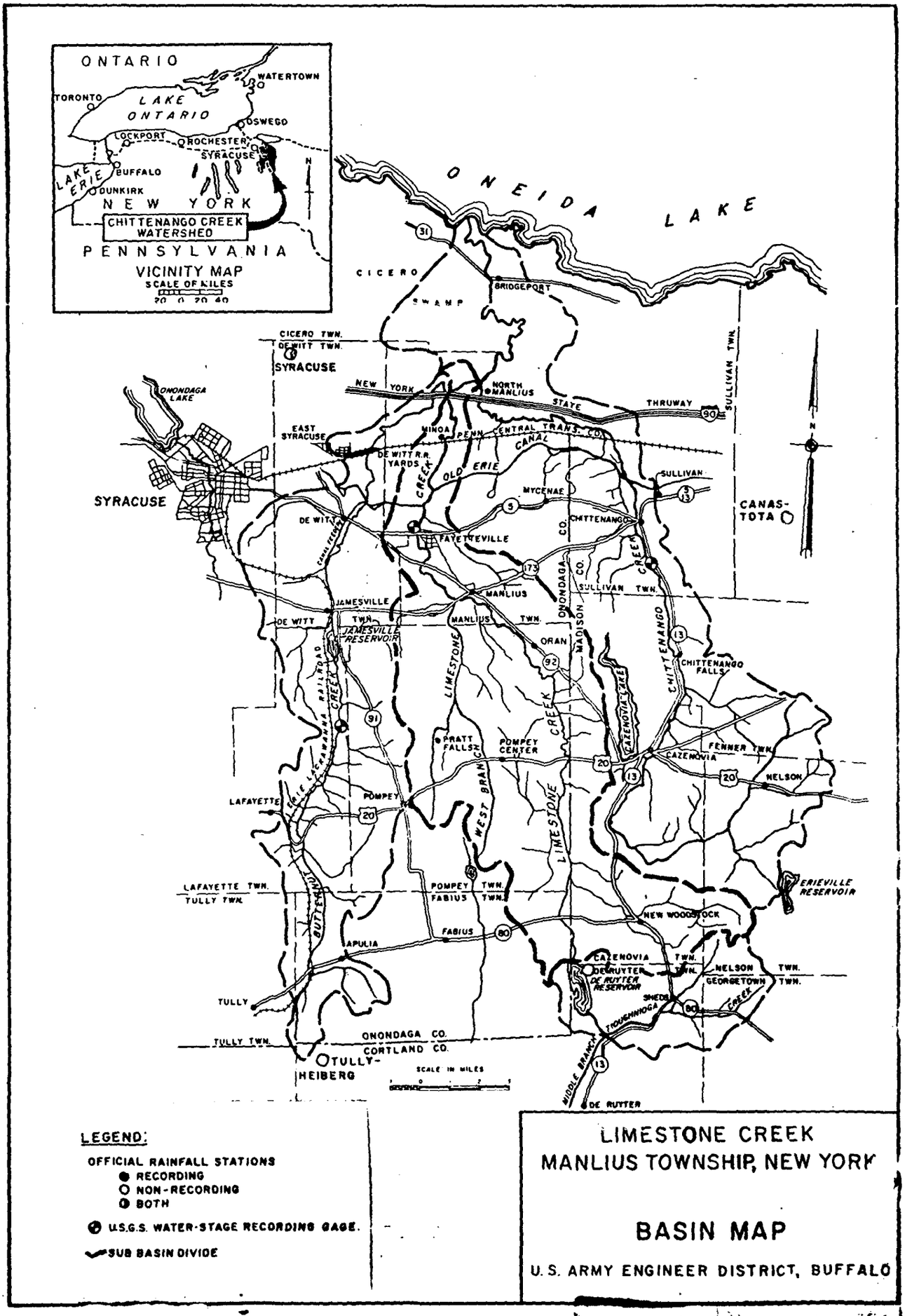
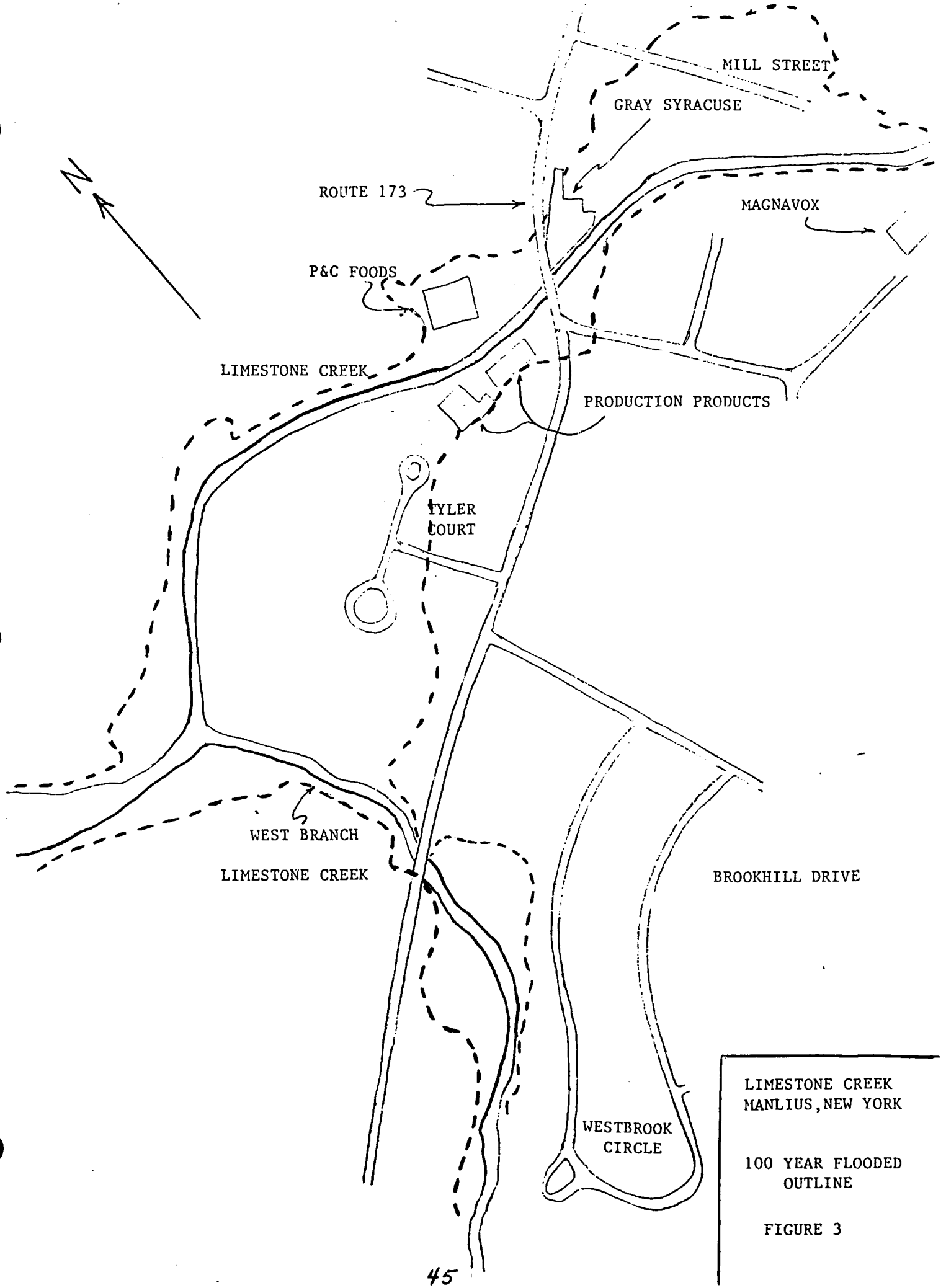
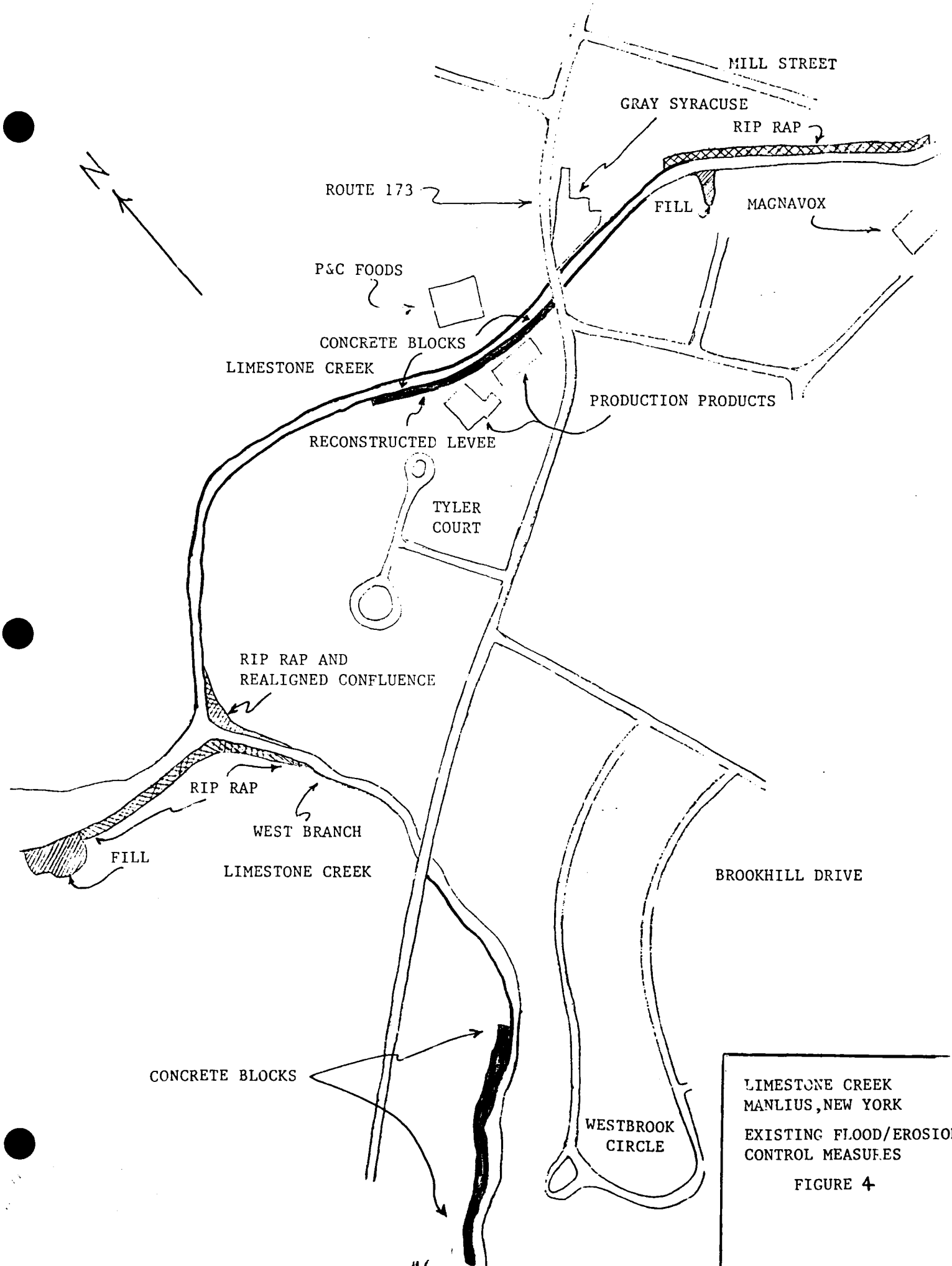

ONTARIO
WATERTOWN
TORONTO
LAKE ONTARIO
OSWEGO
LOCKPORT
ROCHESTER
SYRACUSE
LAKE ERIE
BUFFALO
DUNKIRK
NEW YORK
CHITTENANGO CREEK WATERSHED
PENNSYLVANIA
VICINITY MAP
SCALE OF MILES
20 0 20 40
N
ONEIDA LAKE
CICERO SWAMP
CICERO TWN.
DE WITT TWN.
SYRACUSE
BRIDGEPORT
SULLIVAN TWN.
ONONDAGA LAKE
NEW YORK STATE THRUWAY
NORTH MANLIUS
EAST SYRACUSE
MINOA
PENN CENTRAL TRANS. CO.
DE WITT R.R. YARDS
OLD ERIE CANAL
CREEK
SULLIVAN
MYCENAE
CANASTOTA
DE WITT
CHITTENANGO
FAYETTEVILLE
CHITTENANGO CREEK
ONONDAGA CO.
MANLIUS
JAMESVILLE
DE WITT TWN.
MANLIUS TWN.
JAMESVILLE RESERVOIR
ORAN
MADISON CO.
CHITTENANGO FALLS
LIMESTONE CREEK
ERIE LACKAWANNA RAILROAD
PRATT FALLS
POMPEY CENTER
CAZENOVIA CREEK
CAZENOVIA
FENNER TWN.
NELSON
LAFAYETTE
POMPEY
WEST BRANCH
LIMESTONE CREEK
LAFAYETTE TWN.
TULLY TWN.
POMPEY TWN.
FABIUS TWN.
BUTTERNUT CREEK
ERIEVILLE RESERVOIR
NEW WOODSTOCK
FABIUS
APULIA
CAZENOVIA TWN.
NELSON TWN.
DE RUYTER
DE RUYTER RESERVOIR
GEORGETOWN TWN.
SHEDS
TULLY
TRUXINNOGA CREEK
ONONDAGA CO.
TULLY TWN.
CORTLAND CO.
OTULLY-HEIBERG
SCALE IN MILES
MIDDLE BRANCH
DE RUYTER
LEGEND:
OFFICIAL RAINFALL STATIONS
RECORDING
NON-RECORDING
BOTH
U.S.G.S. WATER-STAGE RECORDING GAGE.
SUB BASIN DIVIDE
LIMESTONE CREEK
MANLIUS TOWNSHIP, NEW YORK
BASIN MAP
U. S. ARMY ENGINEER DISTRICT, BUFFALO

FIGURE 2

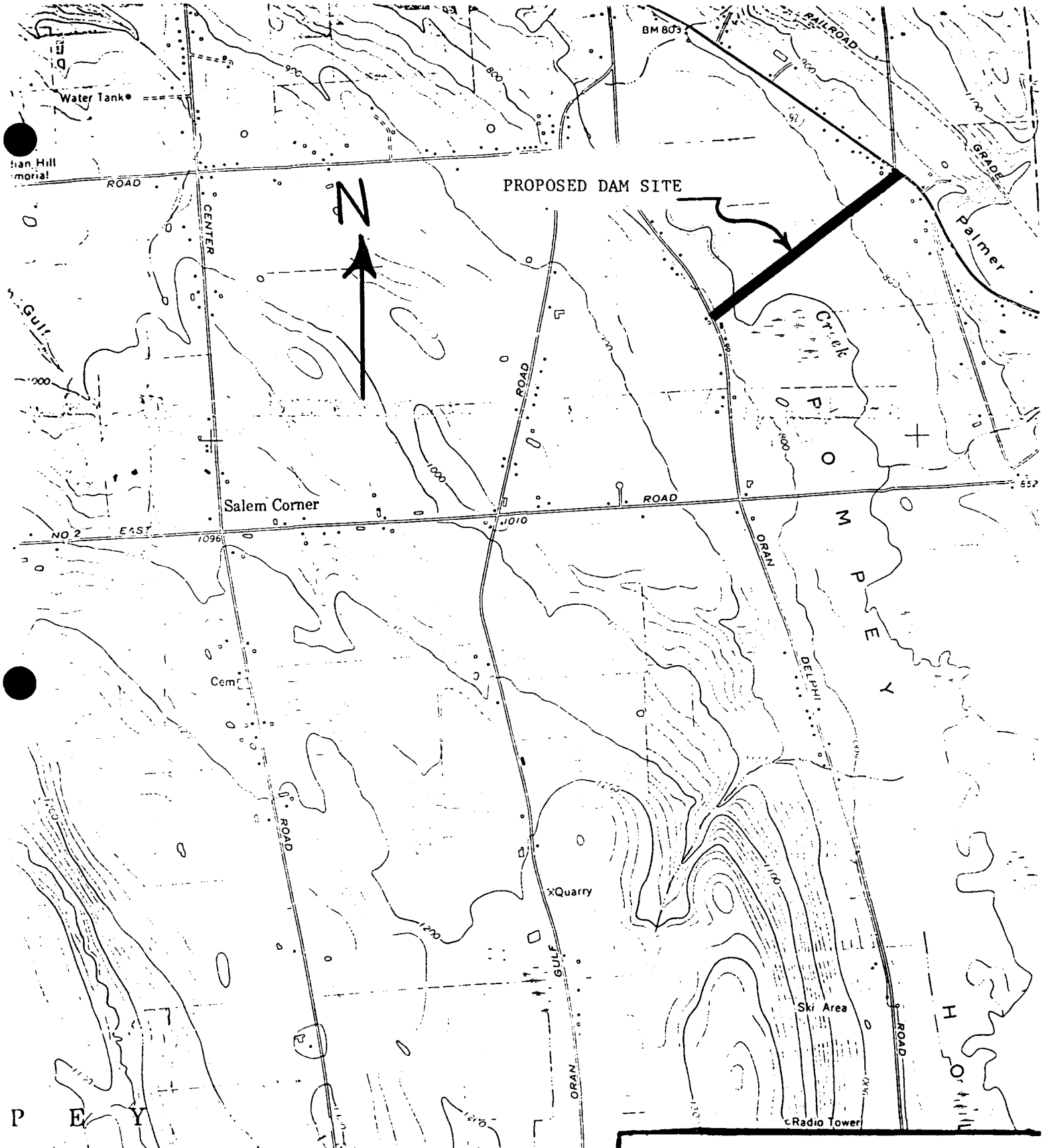

MILL STREET
GRAY SYRACUSE
ROUTE 173
MAGNAVOX
P&C FOODS
LIMESTONE CREEK
PRODUCTION PRODUCTS
TYLER COURT
WEST BRANCH
LIMESTONE CREEK
BROOKHILL DRIVE
WESTBROOK CIRCLE
LIMESTONE CREEK
MANLIUS, NEW YORK
100 YEAR FLOODED OUTLINE
FIGURE 3



LIMESTONE CREEK
MANLIUS, NEW YORK

EXISTING FLOOD/EROSION
CONTROL MEASURES

FIGURE 4



LIMESTONE CREEK
POMPEY, NEW YORK
PROPOSED DAM AND RESERVOIR

FIGURE 5

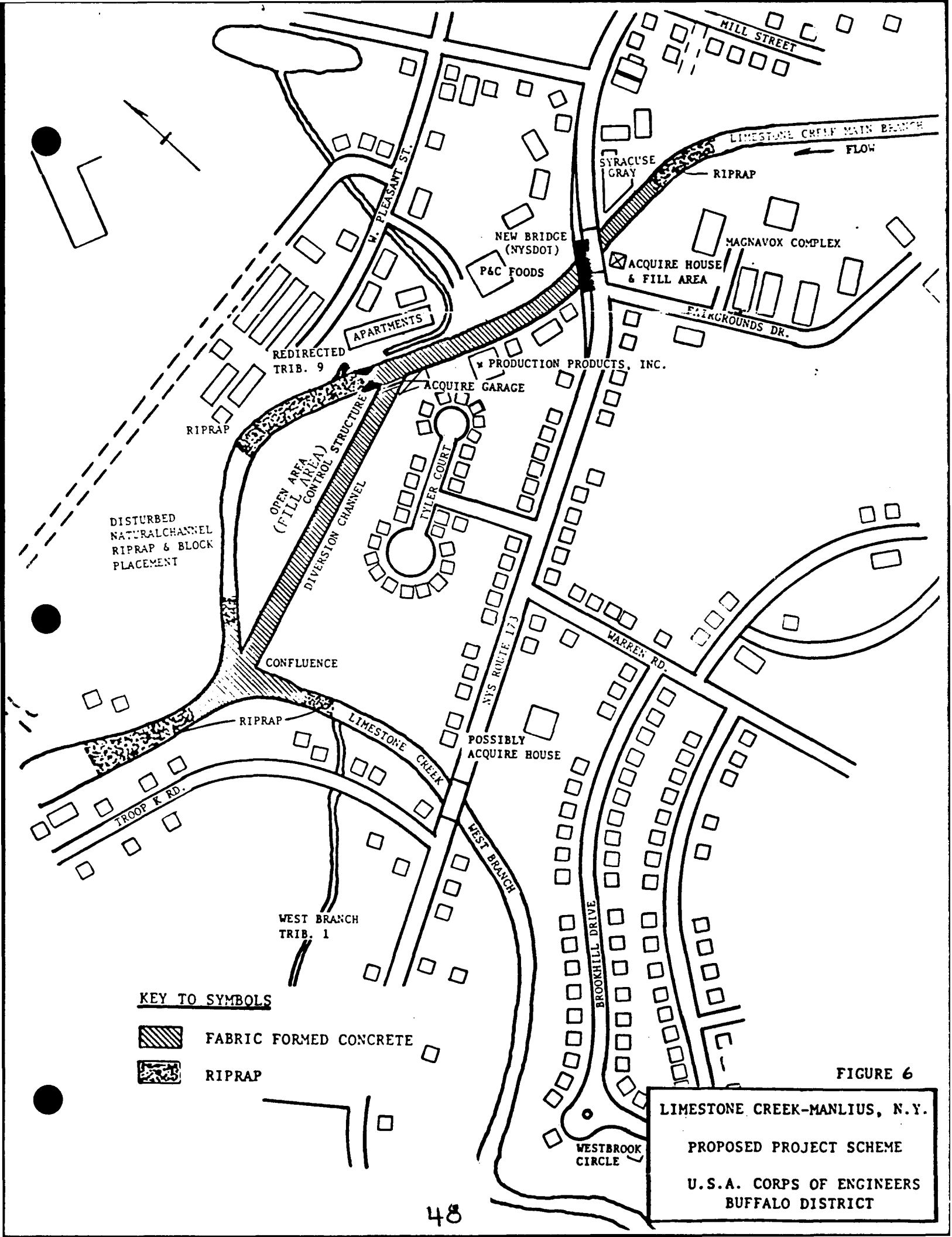


FIGURE 6

LIMESTONE CREEK-MANLIUS, N.Y.

PROPOSED PROJECT SCHEME

U.S.A. CORPS OF ENGINEERS
BUFFALO DISTRICT

PHOTOGRAPHS

PHOTO 1. The deck of the Route 173 bridge over the West Branch of Limestone Creek was removed by a flood in 1915.

PHOTO 2. Rip rap was placed along the banks of both branches of Limestone Creek by the state of New York after the 1981 flood.

PHOTO 3. Debris caused a 75% blockage of the Route 173 bridge over the West Branch Limestone Creek during the October 1981 flood.

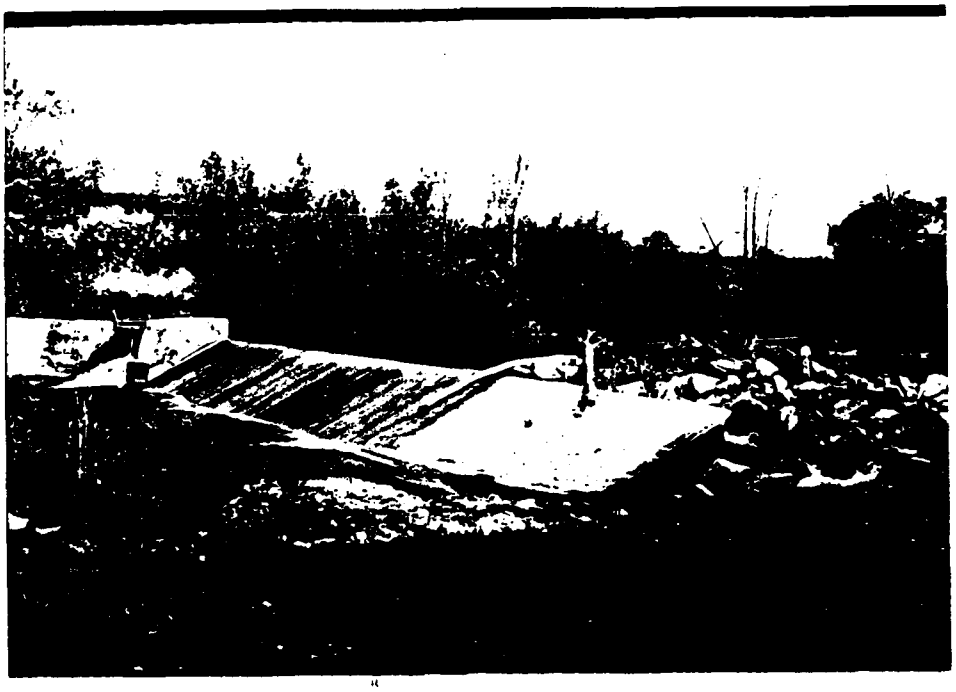


PHOTO 4. The left side of the Mc Intyre dam (shown here in the lower right of the photo) was damaged during the 1974 flood.

FINAL
ENVIRONMENTAL IMPACT STATEMENT

SECTION 205 PROPOSED PLAN FOR FLOOD DAMAGE REDUCTION ON LIMESTONE CREEK AT MANLIUS, ONONDAGA COUNTY, NY

The responsible lead agency is the U. S. Army Engineer District, Buffalo, NY. The responsible cooperating agency is the New York State Department of Environmental Conservation (NYSDEC).

ABSTRACT: The village of Manlius is a small community in Onondaga County located about 8 miles southeast of the city of Syracuse in central New York State. Both Limestone Creek and the West Branch of Limestone Creek flow through the village joining just outside the corporate limits. Both branches have contributed to flooding in the past causing property damage and hardships for residences and businesses in the community. The Buffalo District has investigated public concerns and potential alternative solutions for addressing these flooding problems. Of the array of measures and plans initially reviewed, only three were selected for final consideration and comparison. Plan 1, the No-Action Plan, indicates that the Federal Government could not justify Federal action in addressing the flooding problems at Manlius under the 205 Authority. The No-Action Plan is always considered a possibility even though it would not sufficiently satisfy any of the primary plannning objectives. With this plan, existing and anticipated future conditions are assumed. It serves as a basis of comparison by which the other alternatives may be compared and must be carried forward through the planning process. Plan 2 - Relocate Production Products, Inc., would involve the relocation within the community of an important manufacturing business which accounts for a majority of the estimated potential flood damages. This plan was preferred environmentally since it would not adversely impact the important fishery resources in the creek. In the final analysis however, it was determined to be not economically feasible. Additionally, although the alternative would eliminate substantial potential flood damage, it would protect only one development rather than a multitude of community floodprone developments and was not socially favorable. Plan 3 - Channelization with Fabric Formed Concrete Erosion Protection would involve channelization measures incorporating: some instream channeliztion; construction of a diversion control structure; and construction of a high-flow diversion channel. Portions of the channel work would incorporate fabric formed concrete and/or riprap stone erosion protection. This plan is considered to be engineeringly and economically feasible. It would protect the multitude of community floodprone developments including Production Products, Inc., and is considered socially acceptable. Although some unavoidable adverse impacts to the creek' fishery habitat would occur, substantial environmental design measues are incorporated to make the plan environmentally acceptable. Environmental design measures include: use of a diversion channel; low-flow, pool, and riffle channel design; channel fishery habitat stabilization; riparian vegetation retention and/or revegetation; siltation and erosion control measures; instream construction scheduling; and riparian access and land use assurances. Having assessed the various alternatives for engineering and economic feasibility and social and environmental acceptability, Plan 3 has been tentatively selected based on its performance in addressing the identified community needs and in sufficiently satisfying the national goals and project planning objectives. Plan 3 is the plan which reasonably maximizes NED benefits.

If you would like further information on this statement please contact:

Mr. Tod Smith
Commercial Telephone:
(716) 876-5454, extension 2173
FTS: 473-2173

NOTE: (1) Information, displays, maps, etc., discussed in the Limestone Creek, Manlius-Detailed Project Report - Main Report are incorporated by reference in the EIS.

(2) Plan 6 in the DPR Main Report is Plan 1 in this EIS.
Plan 5 in the DPR Main Report is Plan 2 in this EIS.
Plan 10 in the DPR Main Report is Plan 3 in this EIS.

SUMMARY

MAJOR CONCLUSIONS AND FINDINGS

The village of Manlius is a small community in Onondaga County located about 8 miles southeast of the city of Syracuse in central New York State. Both Limestone Creek and the West Branch of Limestone Creek flow through the village joining just outside the corporate limits. Both branches have contributed to flooding in the past causing property damage and hardships for residences and businesses in the community. The Buffalo District has investigated public concerns and potential alternative measures for addressing these concerns.

This study is being completed under authority of Section 205 of the 1948 Flood Control Act, as amended, which authorizes small flood control projects. The study shows that there are feasible flood damage reduction measures whose total Federal first cost would not exceed the Federal cost limit for projects authorized under this authority. Completion of the study under this small projects continuing authority significantly expedites the potential for implementation of an alternative solution in addressing the public concern with flooding.

Alternative measures and plans have been evaluated for engineering and economic feasibility and social and environmental acceptability in order to select these which best meet the planning objectives of the study. The primary planning objectives include: to contribute to national economic development consistent with protecting the nation's environment pursuant to environmental requirements; to provide flood damage reduction measures, where possible, to the existing floodprone community developments; to reduce flood-related health and safety hazards; to conserve or enhance, where possible, fish and wildlife and cultural resources; and to encourage wise flood-related future community development policies.

Of the array of measures and plans initially reviewed, only three were selected for final consideration and comparison. Plan 1, the No-Action Plan, indicates that the Federal Government could not justify Federal action in addressing the flooding problems at Manlius under the 205 authority. The No-Action Plan is always considered a possibility even though it would not sufficiently satisfy any of the primary planning objectives. With this plan, existing and anticipated future conditions are assumed. It serves as a basis of comparison by which the other alternatives may be compared and must be carried forward through the planning process. Plan 2 - Relocate Production Products, Inc., would involve the relocation within the community of an important manufacturing business which accounts for a majority of the estimated potential flood damages. This plan was preferred environmentally since it would not adversely impact on the important fishery resources in the creek. In the final analysis however, it was determined to be not economically feasible. Additionally, although the alternative would eliminate substantial potential flood damage, it would protect only one development rather than a multitude of community floodprone developments and was not socially favorable. Plan 3 Channelization with Fabric Formed Concrete

Erosion Protection would involve channelization measures incorporating: some instream channelization, construction of a diversion control structure, and construction of high-flow diversion channel. Portions of the channel work would incorporate fabric formed concrete and/or riprap stone erosion protection. This plan is considered to be engineeringly and economicaly feasible. It would protect the multitude of community floodprone developments including Production Products, Inc., and is considered socially acceptable. Although some unavoidable adverse impacts to the creek's fishery habitat would occur, substantial environmental design measures are incorporated to make the plan environmentally acceptable. Environmental design measures include: use of a high-flow diversion channel design; incorporation of a fishery access low-flow channel including some pool/riffle zones; disturbed natural channel rehabilitation - to include random placement of riprap and concrete block to help diversify fishery habitat; riparian vegetation retention and/or revegetation, where possible; incorporation of siltation and erosion control measures - to include expeditious revegetation of disturbed soil areas; careful realignment of Tributary 9 to maintain fishery access scheduling of instream construction to avoid or minimize impacts on fish spawning; monitoring of PH in the creek during construction of the project; and incorporation of riparian access and land-use assurances into the design and specifications. Additionally, the contractor performing the work will be required to comply with the most current "Civil Works Construction Guide Specifications for Environmental Protection, CW - 01430" dated July 1978.

The evaluation process requires that feasible alternatives be evaluated to determine their efficiency in meeting the national water resources planning objectives. This requires identification of a NED (National Economic Development) Plan consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Plan 3 - Channelization with Fabric Formed Concrete Erosion Protection most reasonably maximizes net National Economic Development (NED) benefits consistent with the Federal objective and is identified as the NED Plan accordingly. It best meets the study authority objective of flood protection for the community. It is both engineeringly and economically feasible and with appropriate environmental measures is considered environmentally and socially acceptable. It is identified as the Selected Plan.

AREAS OF CONTROVERSY

Three major areas of controversy were noted during this study.

1. Many people believe that a dam and reservoir alternative would best serve to alleviate the flooding problems of the communities within the Limestone Creek watershed. The Buffalo District (COE) investigated this measure. It was determined, however, that implementation of this alternative could only partially address the problem and would require additional: localized flood control measures, time, and funding. Significant institutional, environmental, and cultural resource problems would also need to be resolved. Therefore, this alternative was not recommended for further investigation under this study authority.

2. If Plan 2 - Relocation of Production Products, Inc., were implemented, basically, only one entity - although important to the community - would be protected. A controversy in providing protection to a single entity versus protection to a multitude in the community (through Government action and funding) is/would be of major issue. A plan beneficial to a multitude of the public is preferred.

3. Because of the extremely high existing and design flow velocities through the Manlius project vicinity, extensive erosion protection measures are required which limit the selection of any effective structural measure that is both engineeringly acceptable and economically feasible. Of the structural plans evaluated, only Plan 3 - Channelization with Fabric Formed Concrete Erosion Protection could satisfy these minimum requirements. Its implementation, however, would create environmental problems which require environmental design measures. Limestone Creek, including the Manlius vicinity, supports an important sport (trout) fishery. Controversies between parties with interests in flood protection and those with environmental concerns (particularly pertaining to the sport fishery, impact significance, and appropriate environmental design efforts) were of issue. Significant efforts have been made to incorporate environmental measures where feasible to make the proposed plan environmentally acceptable.

UNRESOLVED ISSUES

a. Finalization of the Federal-State and State-Local agreement.

b. Finalization of supplemental cultural resources investigation, assessment, coordination, and mitigation measures, if necessary. Reference CULTURAL RESOURCES sections of the report for details.

RELATIONSHIP TO ENVIRONMENTAL PROTECTION STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS

Reference the following table.

EIS TABLE 1 – Relationship of Plans to Environmental Protection Statutes and Other Environmental Requirements

	Alternative 1 No Action	Alternative 2	Alternative 3 SELECTED[1]
Federal Statutes			
Archeological and Historic Preservation Act. as amended, 16 USC 469, et seq.	N/A	Full	Partial
National Historic Preservation Act, as amended, 16 USC 470a, et seq.	N/A	Full	Partial
Fish and Wildlife Coordination Act, as amended, USC 661, et seq.	N/A	Full	Full
Endangered Species Act, as amended, 16 USC 1531, et seq.	N/A	Full	Full
Clean Air Act, as amended, 42 USC 7401, et seq.	N/A	Full	Full
Clean Water Act, as amended (Federal Water Pollution Control Act), 33 USC 1251, et seq.	N/A	Full	Full
Federal Water Project Recreation Act, as amended, 16 USC 460-1(12), et seq.	N/A	Full	Full
Land and Water Conservation Fund Act, as amended, 16 USC 4601-11, et seq.	N/A	Full	Full
National Environmental Policy Act, as amended, 42 USC 4321, et seq.	N/A	Full	Full
Rivers and Harbors Act, 33 USC 401, et seq.	N/A	N/A	N/A
Wild and Scenic River Act, as amended, 16 USC 1271, et seq.	N/A	N/A	N/A
Coastal Zone Management Act, as amended, 16 USC 1451, et seq.	N/A	N/A	N/A
Estuary Protection Act, 16 USC 1221, et seq.	N/A	N/A	N/A
Marine Protection, Research and Sanctuaries Act, 22 USC 1401, et seq.	N/A	N/A	N/A
Watershed Protection and Flood Prevention Act, 16 USC 1001, et seq.	N/A	Full	Full
Farmland Protection Policy Act, (7 USC 4201 et seq.	N/A	Full	Full
Executive Orders, Memoranda, Etc.			
Protection and Enchancement of the Cultural Environment (EO 11593)	N/A	Full	Partial
Flood Plain Management (EO 11988)	N/A	Full	Full
Protection of Wetlands (EO 11990)	N/A	Full	Full
Environmental Effects Aboard of Major Federal Actions (EO 12114)	N/A	N/A	N/A
Analysis of Impacts on Prime and Unique Farmlands (CEQ Memorandum, 30 Aug 76)	N/A	Full	Full
New York State Freshwater Wetlands Act (Westlands >12.4 acres)	N/A	Full	Full
Environmental Conservation Law - Article 15 (Protection of Water)	N/A	Full	Full
Local Land Use Plans (See Flood Plain Management EO 11988, also)	N/A	Full	Full

The compliance categories used in this table were assigned based on the following definitions:

a. Full Compliance - All requirements of the statue, EO, or other policy and related regulations have been met for this stage of the study.

b. Partial Compliance - Some requirements of the statue, EO, or other policy and related regulations, which are normally met by this stage of planning, remain to be met.

c. Noncompliance - None of the requirements of the statute, EO, or other policy and related regulations have been met.

d. N/A - The statue, EO, or other policy and related regulations are not applicable for this study.

FINAL
ENVIRONMENTAL IMPACT STATEMENT

SECTION 205 PROPOSED PLAN FOR FLOOD DAMAGE REDUCTION
ON LIMESTONE CREEK AT MANLIUS, ONONDAGA COUNTY, NY

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

SECTION 1
NEED FOR AND OBJECTIVES OF THE ACTION

INTRODUCTION

1.01 This section briefly summarizes why the Corps became involved in the study and what public concerns and subsequent planning objectives were identified as the basis for plan formulation.

STUDY AUTHORITY

1.02 This report was prepared under the authority of Section 205 of the 1948 Flood Control act, as amended. An investigation to determine the applicability of Section 205 was initiated in March of 1977 in response to requests by local representatives to the Corps of Engineers. A Reconnaissance Report was completed in July of 1977 and further detailed investigation approved. Subsequently, the detailed planning investigation and preparation of the Detailed Project Report was initiated in October of 1979.

PROBLEMS AND NEEDS

1.03 The village of Manlius is located in the town of Manlius about 8 miles southeast of Syracuse in central New York State. Both Limestone Creek and the West Branch of Limestone Creek flow through the village joining just outside the corporate limits. Limestone Creek then flows north through the villages of Fayetteville and Minoa, NY. See Reference Figure 1, immediately following the EIS text.

1.04 Both branches of Limestone Creek have flooded Manlius in the past. Manlius is almost completely developed in the flood hazard area. There are 55 residences, four commercial, two industrial, and two public buildings within the 100-year flood outline. See Reference Figure 2. The Mill Street and Tyler Court areas have been most frequently flooded. Homes in the West Brook Circle and Brookhill Drive area are endangered by potential West Branch flooding. Estimated project life average annual damage in the village is $417,600.

1.05 An important new industry is the cable television hardware manufacturing complex operated by Magnavox and supplied by Production Products, Inc. of Manlius. Production Products is located in the 100-year flood plain and because of the current rapid growth of the market for cable television, its production cannot be replaced by other sources in this country in the short term. Additionally, this industry provides significant employment for the community. Potential damage to Production Products accounts for a substantial portion of the estimated average annual damage.

1.06 In addition to the substantial damages experienced and anticipated from flooding, the public - through public workshops, correspondence, and conversations - expressed the need for greater protection from flood-related community disruption and health and safety problems.

1.07 Limestone Creek, from its source to the village of Fayetteville, is recognized by New York State as one of the top 50 trout streams in the State. The New York State Department of Environmental Conservation, the U.S. Department of the Interior - Fish and Wildlife Service, Trout Unlimited, and other environmental interests have expressed a strong concern that this fact be given appropriate consideration in the plan formulation process.

1.08 Additionally, a number of Federal and State statutes, Executive Orders, and other legislation must be considered in the plan formulation process. See EIS Table 1, page v.

PLANNING OBJECTIVES

1.09 The Federal objective of water and related land resources project planning is to contribute to National Economic Development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable Executive Orders, and other Federal planning requirements.

1.10 Planning objectives which were derived from resource management needs and utilized in plan formulation for the project vicinity include:

a. To provide where economically feasible, flood damage reduction measures for the existing floodprone community developments to preserve community economic and social well-being.

b. Protection of manufacturing capability in the cable television hardware industry. That industry is operating at nearly full capacity nationwide, so Manlius' contribution is irreplaceable in the short term.

c. To reduce through flood damage reduction measures, health and safety hazards related to flooding in the Manlius vicinity.

d. To preserve or enhance where possible, the fish and wildlife resources (habitat) in the project vicinity to protect the natural environmental quality in the project vicinity.

e. To preserve, as necessary, cultural resources in the project vicinity to protect the cultural heritage of the Manlius vicinity.

f. To encourage future land use practices consistent with national flood insurance and flood plain management policies to protect future community economic and social well-being and environmental quality.

SECTION 2
ALTERNATIVES

INTRODUCTION

2.01 This section will briefly identify and describe all reasonable and feasible alternatives considered, and the assessment and evaluation of the most responsive alternatives. Reference the Detailed Project Report for more detail on plan formulation and plan selection.

PLANS ELIMINATED FROM FURTHER STUDY

2.02 With the initiation of the Detailed Project Report (DPR) investigation, a wide spectrum of both structural and nonstructural measures were considered in developing possible alternative solutions to the flooding problems in the project vicinity. See Reference Table 1. These measures were examined alone or in combination as alternative plans in satisfying the planning objectives and for their engineering and economic feasibility and environmental and social acceptability. Most were readily eliminated through preliminary evaluation.

2.03 The following plan concepts were considered in some detail but were not carried forward for final consideration or implementation.

2.04 Dam and Reservoir - A dam and reservoir alternative was given significant consideration in the DPR investigation. Sites in the upper reaches of both the main and west branches of the creek were considered. Essentially, with this concept, a dam with control gates and a temporary reservoir area would be constructed in the upstream reaches of the watershed. During periods of potential flooding, water would be impounded in the reservoir area behind the dam reducing downstream creek flows and the associated flooding potential. The retention capacity of the system is dependent upon the available site location in the watershed. After the potential flooding conditions have passed, the impounded water would gradually be released to flow downstream.

2.05 Although it was determined that this could provide some flood damage reduction benefits to the watershed, alleviating some problems in Manlius and Fayetteville, the retention capacity of such a system was not sufficient. The flood protection level would be relatively low (far less than for a 100-year event) and additional remedial measures would be required at each location (Manlius and Fayetteville) to sufficiently supplement flood protection needs. The estimated cost of this alternative far exceeded the funding limit set by the Section 205 study authority; the difference of which would have to be financed by the local sponsors. Additionally, environmental concerns, particularly of potential impacts to cultural resources and valuable fisheries habitat in the upper reaches of both the main and west branches, hindered further realistic pursuit of a dam and reservoir solution.

2.06 Evacuation and/or Relocation from the Flood Plain - With this concept, all of the existing developments within the project area 100-year event flood plain would be either acquired (residents relocated), structurally relocated,

or floodproofed. Preliminary estimates indicate that most of the 55 residences and eight commercial, industrial, or public developments would need to be acquired and/or relocated. Only a few could be floodproofed. Relocated residences and businesses would be reestablished elsewhere in nonfloodprone areas of the surrounding communities. The flood plain area would then be restored to more natural or park like conditions, or possibly in same areas redeveloped with floodproof developments in accordance with strict flood plain management policies.

2.07 The estimated cost of this alternative exceeded estimated costs of alternate structural plans. It also exceeded the funding limit set by the Section 205 study authority; the difference of which would have to be financed by the local sponsors. The natural environment in the flood plain area could benefit from the implementation of this plan since the creek area would be returned to more natural conditions. However, some adverse effects could occur from redevelopment in other areas of the community. Of significant concern were the substantial complications and efforts required to implement such a plan and the extensive community and social disruption that would occur with its implementation. This plan, as a whole, was not considered for further detailed consideration.

2.08 Levee/Floodwall with Channelization Improvements - This concept combines structural levee/floodwall and channelization measures to confine flood waters to the immediate creek channel and to funnel them past the existing developments. Several versions of this concept were examined for possible application in the Manlius project vicinity. Levee/floodwall and channelization measures were applied in combination to stream reaches of the project area where they could be most effective.

2.09 This concept was considered to be favorable relatively late into the plan formulation process. These plans would provide 100-year event flood level protection to all of the existing structural developments eliminating the need for relocation of any community development. The estimated costs (at the time) were questionable as to remaining within the Section 205 study authority funding levels. Although the net natural environmental impacts would likely be somewhat negative, it appeared as if sufficient environmental design measures could make the concept environmentally acceptable.

2.10 The initial analysis of this concept assumed that the MacIntyre Dam which was located at the downstream reach of the project area would be maintained. This dam, however, was damaged during the October 1981 flood and subsequently removed. More detailed hydrologic design analysis showed that the very high stream flow velocities (further increased by the dam's removal) through the project area during flood conditions would create severe channel erosion problems. This would require, in addition to the levee/floodwall and channel construction, extensive erosion protection measures. Such a system would then be exorbitantly expensive as compared to other feasible alternatives. Levee/floodwall and channelization systems with earthen or riprap lined channels were, therefore, elimiinated from further consideration.

WITHOUT CONDITIONS (NO-ACTION)

2.11 Both the town of Manlius and the village of Manlius participate in the Federal flood insurance program sponsored by the Federal Emergency Management Agency. Although available flood insurance would help to compensate for economic losses due to flooding and flood plain management measures would help to prevent additional future flood damages; these measures do little to prevent flooding of existing developments and are not considered a final solution to the flooding problems in Manlius.

2.12 Should no Federal action be taken to assist in addressing the flooding situation in the village of Manlius, it is expected that the existing potential for significant flooding and associated damages and community disruptions would continue. The local community has limited capabilities in addressing the problem alone. Although some local remedial measures may occur, such as those taken after the 1981 flood, the effectiveness of these actions do not provide for a solid solution. Additionally, these types of remedial actions would continue periodically to require expenditure of local resources and periodically disrupt the existing creek and riparian natural environments.

2.13 In the long-term, the rather extensive existing community developments would likely remain, although some may deteriorate and eventually be lost due to recurring flooding. New and redevelopment will be more influenced by flood insurance and flood plain management policies. Under these policies, no structural development would be allowed in designated floodways and new or redevelopments in flood plain areas would require 100-year event level flood protection. In addition to reducing future potential flood damage, this should help to conserve both aquatic and riparian natural habitats.

PLANS CONSIDERED IN DETAIL

2.14 After several iterations of plan formulation, assessment, and evaluation, the following plans were identified as most feasible and were considered for final detailed examination.

2.15 Plan 1 - No-Action (Without Conditions) - This plan indicates that the Corps of Engineers acting for the Federal Government could take "no-action" based on an evaluation of the problems and possible alternative solutions as directed by the study authority. Without conditions would be anticipated with this alternative. The No-Action alternative is always a possibility and serves as the basis of comparison by which the other possible alternatives may be compared.

2.16 Although compensation for flood damages (after the fact), and prevention of significant additional future flood damages may be realized in the long-term under policies as set forth by the national flood insurance program; this plan would not satisfy the immediate primary planning objective of flood protection. Although the natural and cultural resources in the project area would not be significantly affected by this plan, flooding

conditions would continue periodically to adversely affect most major parameters/ aspects of the human environment in the project vicinity. Basically, this plan is socially unacceptable, unless no other feasible alternative is possible.

2.17 Plan 2 - Relocate Production Products, Inc., (Non-Structural) - With this alternative, Production Products, Inc., which accounts for a substantial portion of the areas potential average annual flood damages, would be relocated from the flood plain and reestablished elsewhere in the community. The existing buildings would likely be razed and the area returned to a more natural setting. This was initially considered as potentially feasible and was, therefore, considered in detail.

2.18 This would be preferred from the natural environmental perspective, since the stream and its significant fishery and habitat would not be substantially altered by plan implementation. Other than this, existing and anticipated "without project conditions" would be expected. There are several predominant problems with this alternative, however. The final detailed economic analysis shows that this plan is not economically feasible with negative net benefits and a benefit-to-cost ratio of only .20. Also, the owner of Production Products, Inc., in a letter dated 31 January 1984, stated that: "Due to the cost and subsequent production downtime, we have determined that it would not be feasible to move Production Products from its present location" (copy of letter in report Appendix F). His flood insurance and limited floodproofing is his other alternative. Additionally, this alternative would protect only a single entity, only partially satisfying the predominant planning objective of flood protection for the community. The remaining floodprone developments, including 55 residences, four commercial, one industrial, and two public establishments would continue to be subjected to potential periodic flooding and associated damages and disruption. After final analysis, this alternative is considered to be: engineeringly feasible but not economically feasible, environmentally (EQ - natural environmental quality) feasible but not institutionally and socially acceptable.

2.19 Plan 3 - Channelization with Fabric Formed Concrete Erosion Protection - The only effective structural alternative initially identified as both engineeringly and economically acceptable was: to channelize along the existing stream and provide fabric formed concrete erosion protection through the entire project vicinity. The reason for the extensive erosion protection as identified in paragraph 2.10, is the very high design-stream-flow velocities which would pass through the area during potential flood periods. This preliminary plan, however, was not environmentally acceptable due to the anticipated adverse impacts to significant fisheries habitat and associated resources of Limestone Creek. Environmental aspects of this plan were discussed both in-house and in direct discussion with concerned Federal, State, and local environmental interests. Essentially, it was determined that adverse impacts of the alternative, as it existed, could not be successfully mitigated. An alternate version of this plan was developed through these discussions.

2.20 This version (Reference EIS Figure 1) would incorporate the following:

a. The existing channel in the upper reach of the Manlius project area would be shaped (similar to existing dimensions - 35-foot bottom width, 1 on 2 side slopes) and then lined with heavy stone riprap in the transition zone (250 feet±) and fabric formed concrete for the remaining reach length (800 feet±). This upper reach extends from the project area upstream limit to the vicinity of Production Products, Inc. The existing channel alignment must be utilized in this area due to the extensive structural developments in the immediate creek vicinity and lack of any alternate alignment.

b. For this reach, a new Route 173 Bridge would be constructed over the main branch of Limestone Creek to provide for channel design dimension and flow capacity. This would be incorporated with the Federal and local agreement. The bridge replacement would be performed by the New York State Department of Transportation. Their tentative plan would be to continue to use the existing bridge for vehicular traffic use while building the replacement bridge immediately to the west of the existing bridge. Once construction of the new bridge is completed, traffic would be rerouted over it: then, the old bridge would be removed.

c. Construction along this upper reach would require the aquisition of the house located on the southeast corner at the Route 173 Bridge and the creek. Acquisition would comply with guidance as set forth by the "Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970," as amended. The house would then be relocated or demolished and the property backfilled with cut material and graded to appropriate elevation.

d. A simple constriction and weir diversion control structure (Reference EIS Figure 2) would be constructed in the creek in the vicinity just downstream of Production Products, Inc. This would act to direct normal creek flows (up to 400 cfs) through the downstream existing channel, and excessive high flows (during potential flood periods) through both the existing channel and a newly excavated high flow diversion channel.

e. Also in this vicinity, the Production Products garage immediately adjacent to the creek will need to be acquired in order to accommodate: construction of the diversion control structure, modification to Tributary 9, and construction of the high flow diversion channel (described in the following paragraphs). This acquisition would also comply with guidance as set forth by the "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970," as amended.

f. The existing channel bottom in the lower reach of the project area (from the control structure to the creek confluence of the main and west branch) would need to be excavated another 0 to 5 feet in depth so that low-flow discharge will continue to flow through this channel. The first 500 feet of the upstream portion of this reach will be stabilized with riprap placement. The middle portion of this reach (800 feet±) will be riprapped with existing channel riprap material and/or placement of block for stream

bank stabilization and fishery habitat rehabilitation. The lower portion of this reach (200 feet±) will be stabilized by confluence transition riprap A short stretch of Tributary 9 (300 feet±), an identified trout spawning tributary, would be realigned maintaining similar gradient, dimension, and characteristics to the degree possible. Presently, Tributary 9 is located upstream of the proposed control structure. In the proposed plan, this tributary will be realigned to flow into the middle reach of the project, thereby allowing for easier fishery access into and out of the tributary and main creek channel. The mouth of realigned Tributary 9 would be located so that it enters over the more natural stream bottom substrate in the main creek below the control structure and fabric-formed concrete. The last 60 feet of the Tributary 9 will be enclosed in a buried rectangular concrete culvert. This is necessary because an open channel with natural sloping banks would require more land than is available without relocation of structures. Also, an open structure with verticle sides would present a safety problem.

g. A newly excavated high-flow diversion channel (bottom width 30 feet wide, 1 on 2 side slopes, 8 feet deep and 1,300 feet± long), would be constructed from the diversion control structure in alignment behind the Tyler Court development to the confluence of the main and west branches of the creek. This diversion channel would also be lined with fabric formed concrete erosion protection and would carry only high creek flows during potential flood periods. A small hydraulic jump would be created by a change in bottom slope at the downstream end of the diversion channel to dissipate high flow energy before reaching the confluence.

h. Erosion protection measures will also be utilized to stabilize the confluence area. The heart of the confluence area will be stabilized with fabric formed concrete lining, while the transition areas (100 feet ±) upstream in the existing main and west creek branches will be stabilized with large stone riprap. Additionally, for several hundred feet (475 feet±) downstream from the immediate confluence area, the channel would be modified (80 feet bottom width, 1 on 2 side slopes) and stabilized with large riprap in transition to existing downstream conditions.

i. Initial access of construction equipment could be obtained by a number of access routes, those most likely being: from the Route 173 Bridge and Magnovox complex area in the upper project reach; from the Route 173 Bridge and Production Products and P&C Foods area or from Route 173 between Tyler Court and Production Products in the upper middle reach; and from Route 173 along the W. Branch or for a short distance from Troop K Road or from the sewage pump - lift station area in the lower and middle reach. Access would occur along structurally adequate existing access roads and/or new or modified project access roads. Subsequent movement of equipment would occur primarily within the immediate construction area.

j. Excavated material would be utilized as fill material and transported and/or temporarily stockpiled within the immediate project area. Examination and coordination pertaining to the area stream conditions indicate that the excavated material would be clean fill material. Upland fill would occur primarily in the area of the diversion channel and in a small area adjacent to the creek and Route 173 Bridge (SE-Corner). If all of the excavated/fill

material cannot be utilized in the immediate project area, it would likely be trucked from the project area via access points previously mentioned to a NYSDEC approved fill/disposal site. Easements and right-of-way would need to be obtained before construction would proceed.

k. Coordinated environmental design measures include: use of a high-flow diversion channel design; incorporation of a fishery access low-flow channel including some pool/riffle zones; disturbed natural channel rehabilitation - to include random placement of riprap and concrete block to help diversify fishery habitat as specified by USF&WS and NYSDEC; riparian vegetation retention and/or revegetation, where possible; incorporation of siltation and erosion control measures - to include expeditious revegetation of disturbed soil areas; careful realignment of Tributary 9 to maintain fishery access, scheduling of instream construction to avoid or minimize impacts on fish spawning; monitoring of Ph in the creek during construction of the project; and incorporation of riparian access and land-use assurances into the design and specifications. Additionally, the Contractor performing the work will be required to comply with the most current "Civil Works Construction Guide Specifications for Environmental Protection CW-01430," dated July 1978. Reference the Environmental Considerations section in the main text of the Detailed Project Report, and the Environmental Appendix which follows this EIS also.

2.21 Basically, this plan would provide 100-year event level flood protection to community structural developments along the main branch of the creek, including Production Products, Inc. Somewhat lesser protection would occur along the west branch. Since estimated average annual damages along the west branch is low, similar (100-year) levels of protection could not be incrementally economically justified. With appropriate environmental measures, the plan can be environmentally acceptable. The project would not induce flooding in areas above or below the project area.

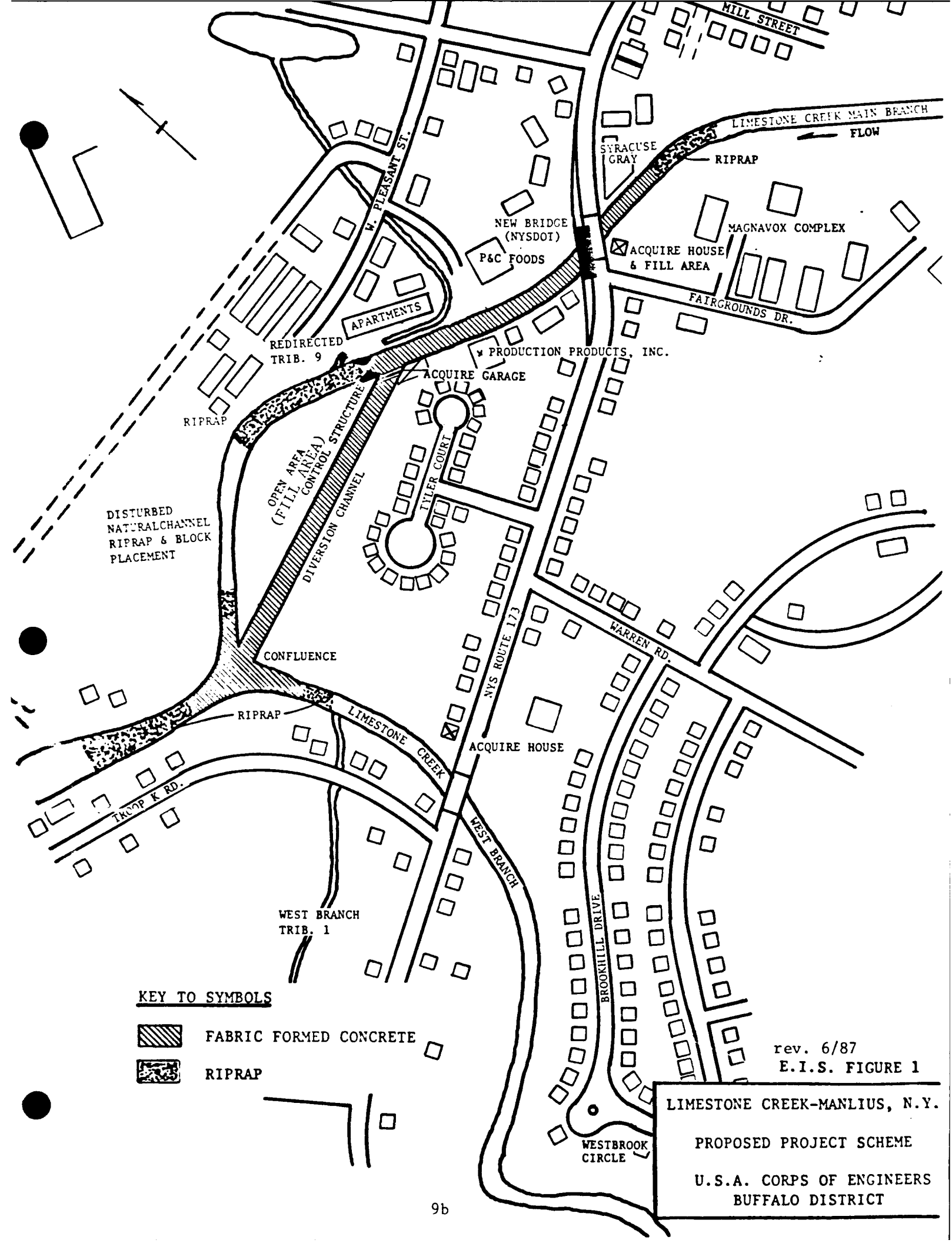
2.22 Reference the Draft Detailed Project Report main text for a more detailed plan description and implementation responsibilities.

THE NED PLAN AND SELECTED PLAN

2.23 Plan 3 - Channelization with Fabric-Formed Concrete Erosion Protection most reasonably maximizes net National Economic Development (NED) benefits consistent with the Federal objective and is identified as the NED Plan accordingly. It best meets the study authority objective of flood protection for the community. It is both engineeringly and economically feasible and with appropriate environmental measures, is considered environmentally and socially acceptable. It is identified as the Selected Plan. Reference the Plan Formulation and Plan Selection sections of the Detailed Project Report.

COMPARABLE IMPACTS OF ALTERNATIVE PLANS

2.25 The following table, EIS Table 2, briefly and comparatively summarizes anticipated impacts associated with implementation of the most feasible alternative plans. These impacts are described in greater detail in SECTION 4 - ENVIRONMENTAL EFFECTS of this environmental statement.


MILL STREET
LIMESTONE CREEK MAIN BRANCH
FLOW
SYRACUSE GRAY
RIPRAP
W. PLEASANT ST.
NEW BRIDGE (NYSDOT)
P&C FOODS
MAGNAVOX COMPLEX
ACQUIRE HOUSE & FILL AREA
FAIRGROUNDS DR.
APARTMENTS
REDIRECTED TRIB. 9
PRODUCTION PRODUCTS, INC.
ACQUIRE GARAGE
RIPRAP
OPEN AREA (FILL AREA) CONTROL STRUCTURE
DIVERSION CHANNEL
TYLER COURT
DISTURBED NATURALCHANNEL RIPRAP & BLOCK PLACEMENT
NYS ROUTE 173
WARREN RD.
CONFLUENCE
RIPRAP
LIMESTONE CREEK
ACQUIRE HOUSE
TROOP K RD.
WEST BRANCH
BROOKHILL DRIVE
WEST BRANCH TRIB. 1
WESTBROOK CIRCLE
KEY TO SYMBOLS
FABRIC FORMED CONCRETE
RIPRAP
rev. 6/87
E.I.S. FIGURE 1
LIMESTONE CREEK-MANLIUS, N.Y.
PROPOSED PROJECT SCHEME
U.S.A. CORPS OF ENGINEERS
BUFFALO DISTRICT

EIS Table 2 - Comparative Impacts of Alternative Plans

Resource Parameters	Alternative Plan 1 No-Action (Without Conditions)	Alternative Plan 2 Relocate Production Products, Inc.	Alternative Plan 3 Channelization with Fabric Formed Concrete Erosion Protection
Benefit/Cost (Average Annual)			
Benefits	- 0 -	$ 24,800	$523,240
Cost	- 0 -	$143,466	$376,400
B/C	- 0 -	0.17	1.39
Net Benefits	- 0 -	-$118,660 Note: Not implementable.	$146,840
Natural Environment			
Topography & Materials	ST: Not Significant LT: Minor Adverse Continued flooding and maintenance channelization.	ST: Minor Adverse LT: Minor Adverse New site construction. Restore old site to more natural conditions. Continued flooding and maintenance channelization.	ST: Moderate Adverse LT: Minor Adverse Instream Channelization 3.5 acres Ripparian Channelization 1.5 acres High Flow Channelization 2.5 acres Excavation (Earthen) 48,000 cy Fill (Earthen) 48,000 cy (8 acres) Riprap 5,550 cy Fabric Formed Concrete 5,700 cy Est Fuel Consumption 2,000 gal. Local Material Sources.
Air Quality	ST: Not Significant LT: Not Significant Similar to existing conditions.	ST: Minor Adverse LT: Not Significant Initial fugutive dust and exhaust from construction and equipment would be temporary short-term. Would not significantly impact ambient air quality. Return to similar existing conditions anticipated soon after construction ceases.	ST: Minor Adverse LT: Not Significant Initial fugutive dust and exhaust from construction and equipment would be temporary short term. Would not significantly impact ambient air quality. Return to similar existing conditions anticipated soon after construction ceases.
Water Quality	ST: Not Significant LT: Not Significant Similar to existing conditions. Some slight improvement anticipated.	ST: Minor Adverse LT: Not Significant Some potential temporary increased creek sedimentation from site demolition.	ST: Moderate Adverse LT: Minor Adverse Initial disruption due to construction channelization; temporary short-term increased creek turbidity and sedimentation; possibly slight increase in water temperature in the summer due to riparian vegetation removal in selected areas.

EIS Table 2 - Comparative Impacts of Alternative Plans (Cont'd)

Resource Parameters	Alternative Plan 1 No-Action (Without Conditions)	Alternative Plan 2 Relocate Production Products, Inc.	Alternative Plan 3 Channelization with Fabric Formed Concrete Erosion Protection
Benthos	ST: Not Significant LT: Minor Adverse Continued disruption due to flooding and maintenance channelization.	ST: Minor Adverse LT: Minor Adverse Some potential temporary increased creek sedimentation from site demolition. Continued disruption due to flooding and maintenance channelization.	LT: Minor Adverse LT: Moderate Adverse Initial disruption due to construction channelization (3.5 Acres). Loss of quality habitat due to placement of concrete lining (1.5 Acres). Some benthic organisms may re-establish on the concrete lining, but to no significant degree. Recolonization elsewhere on channelized creek areas.
Vegetation	ST: Not Significant LT: Minor Adverse Some periodic disruption to riparian vegetation due to continued flooding and maintenance channelization.	ST: Minor Adverse LT: Minor Adverse Old site would be returned to more natural conditions (about 2.8 Acres); new site would be prepared for construction. Same statement as for Plan 1.	ST: Moderate Adverse LT: Moderate Adverse Some riparian vegetation would be lost during channelization (about 1.5 acres) of the creek. Portions of existing riparian and terrestrial vegetation in the project area would not be removed, and all disturbed soil areas would be graded and planted. Although most of the existing vegetation in the vicinity of the proposed diversion channel has *been recently cut down and removed, any* remaining vegetation or native plants that reestablish up to the time of construction, would probably be covered over by fill material excavated from the diversion - which would cover about 7.5 acres of surface area. Some instream chlodophora algae would be destroyed, but would probably reestablish in the natural channel and to some degree on the submerged concrete substrate.
Fisheries	ST: Not Significant LT: Minor Adverse Periodic disruptions due to flooding and maintenance channelization.	ST: Minor Adverse LT: Minor Adverse See water quality and benthos also. Same statement as for Plan 1.	ST: Major Adverse LT: Moderate Adverse Initial disruption to fishery and habitat due to construction and channelization (3.5 Acres). Loss of quality fishery habitat due to in channel concrete lining (1.5 Acres). Environmental design measures to provide lowflow, pools, riffles, cover, access.

EIS Table 2 - Comparative Impacts of Alternative Plans (Cont'd)

Resource Parameters	Alternative Plan 1 No-Action (Without Conditions)	Alternative Plan 2 Relocate Production Products, Inc.	Alternative Plan 3 Channelization with Fabric Formed Concrete Erosion Protection
Wildlife	ST: Not Significant LT: Minor Adverse Periodic disruption of riparian habitat due to flooding and maintenance channelization. No anticipated impact to endangered species.	ST: Minor Adverse LT: Minor Adverse Old site would be restored to more natural conditions; new site would be prepared for construction (about 2.8 Acres). Same statement as for Plan 1.	ST: Moderate Adverse LT: Minor Adverse Initial disruption to riparian and terrestrial wildlife habitat and associated species due to channelization construction (about 4.0 surface acres) and filling of terrestrial land (about 8.0 surface acres). Portions of existing riparian and terrestrial habitat in the project area would not be removed. Disrupted soil areas would be replanted to herbaceous and/or woody vegetation (trees and shrubs) that would provide some future potential open-land type habitat. No anticipated impacts to endangered species.
Human Environment.			
Community and (Local) Regional Growth and Development	ST: Moderate Adverse LT: Major Adverse Continued flood associated damages and community disruptions and flood emergency relief expenditures. Flood insurance and flood plain management policies to influence future developments.	ST: Moderate Beneficial LT: Moderate Beneficial Production Products, Inc. would be protected by relocation. Same statement as for Plan 1.	ST: Moderate Beneficial LT: Major Beneficial Generally, 100-year event level flood protection to existing community developments. Flood emergency expenditures to be better expended elsewhere. Flood insurance and flood plain management policies to influence future developments.
Population (Displacement of People)	ST: Minor Adverse LT: Moderate Adverse Moderate growth. Some continued displacement due to flooding.	ST: Minor Adverse LT: Moderate Adverse Production Products, Inc. operations protected through relocation. Same statement as for Plan 1.	ST: Minor Adverse LT: Major Beneficial Generally, 100-year event level flood protection to existing community developments and residents. Moderate growth. Two residential relocations proposed.
Land Use and Developments (Man-Made Resources)	ST: Minor Adverse LT: Moderate Adverse Continued flood damages to existing developments (about 100 Acres). Approximately 55 residences, eight commercial/industrial/public. Some gradually altered mixed land uses. New and redevelopment influenced by flood insurance and flood plain management policies.	ST: Minor Beneficial LT: Moderate Beneficial Production Products, Inc., operations relocated from the flood plain. Old site returned to more natural conditions. Same statement as for Plan 1.	ST: Moderate Beneficial LT: Major Beneficial Generally, 100-year event level flood protection to existing community development preserving existing land use (about 100 Acres). Approximately 46 residential and six commerical/industrial/public - including Production Products, Inc. Rebuild Route 173 Bridge. Flood plain management policies to influence future developments.

EIS Table 2 - Comparative Impacts of Alternative Plans (Cont'd)

Resource Parameters	Alternative Plan 1 No-Action (Without Conditions)	Alternative Plan 2 Relocate Production Products, Inc.	Alternative Plan 3 Channelization with Fabric Formed Concrete Erosion Protection
Business and Industry/ Employment and Income	ST: Minor Adverse LT: Moderate Adverse Continued flood damages and disruption to existing businesses and industries. Approximately 6 business and industrial developments in the 100-year flood plain. Disruptions to normal employment and incomes due to flooding of existing businesses, industrial, and residential community developments.	ST: Minor Beneficial LT: Moderate Beneficial Prodcution Products, Inc., protected through relocation. Service benefit to Magnovox Corp. also. Same statement as for Plan 1. Associated employment (about 150) and incomes protected through relocation. Same statement as for Plan 1. Some plan implementation/construction opportunities.	ST: Moderate Beneficial LT: Major Beneficial Generally, 100-year event level flood protection for existing business and industrial developments including Production Products, Inc. Approximately 4 business and industrial developments. Service benefit to Magnovox Corp. also. Associated employment (several hundred) and income protection. Plan implementation/construction opportunities.
Recreational Opportunities	ST: Not Significant LT: Minor Beneficial Continued disruption to fisheries and habitat due to periodic flooding and channel maintenance actions, although fisheries would be expected to be sufficiently sustained. Some long-term potential improvement via flood plain management policies.	ST: Minor Beneficial LT: Minor Beneficial Production Products, Inc., would be relocated from the flood plain and the former site returned to more natural conditions. The former site could provide opportunity for riparian access. Same statement as for Plan 1.	ST: Moderate Adverse LT: Minor Adverse Initial disruption to fisheries and habitat due to channelization. Loss of quality fishery habitat due to placement of in-channel concrete lining. Environmental design measures to include: low flow, pools, riffles, cover, access. Plan environmental design measures would provide some improved riparian access.
Agriculture (Displacement of Farms)	ST: Not Significant LT: Minor Beneficial No agricultural districts but some prime soil units have been identified in the immediate project area flood plain. Not conducive to agriculture within village developments. Some potential via long-term flood plain management policies.	ST: Not Significant LT: Minor Beneficial Production Products, Inc., would be relocated from the flood plain and the former site returned to more natural conditions. Same statement as for Plan 1.	ST: Not Significant LT: Not Significant Generally, 100-year event level flood protection to existing community developments preserving existing land use. No significant impacts to agriculture or displacement of farms expected. Some soil redistribution.
Public Facilities and Services	ST: Minor Adverse LT: Moderate Adverse Continued flooding and associated disruptions to community facilities and services. Long-term potential displacement of community developments would decrease efficient use of existing facilities and services and require additional facilities and services elsewhere.	ST: Minor Adverse LT: Moderate Adverse Flood associated disruption to Production Products, Inc., and facilities and services would be alleviated through relocation measure. Same statement as for Plan 1.	ST: Minor Adverse LT: Major Beneficial Generally, 100-year event level flood protection to existing community developments including facilities and services. Less demand for flood emergency problem services. Some minor disruption of services and relocation of utilities due to construction.

EIS Table 2 - Comparative Impacts of Alternative Plans (Cont'd)

Resource Parameters	Alternative Plan 1 No-Action (Without Conditions)	Alternative Plan 2 Relocate Production Products, Inc.	Alternative Plan 3 Channelization with Fabric Formed Concrete Erosion Protection
Property Value and Tax Revenue	ST: Minor Adverse LT: Moderate Adverse With continued flood potential, flood plain property values and improvement potential may continue to be slightly depressed. Associated tax revenues would also be decreased. Recommended flood insurance area for existing developments.	ST: Minor Adverse LT: Moderate Adverse Production Products, Inc., would be protected through relocation measure. Same statement as for Plan 1.	ST: Minor Adverse LT: Moderate Beneficial Generally, 100-year event level flood protection to existing community developments. Property value and associated potential tax revenue may be increased slightly. Need for extensive flood insurance substantially reduced.
Noise	ST: Not Significant LT: Not Significant No severe external noise problems noted or anticipated. Some noise associated with channel maintenance.	ST: Minor Adverse LT: Not Significant Noise associated with construction and plan implementation and some channel maintenance.	ST: Minor Adverse LT: Not Significant Noise associated with construction and plan implementation and some project maintenance.
Aesthetics	ST: Minor Adverse LT: Moderate Adverse Community and creek aesthetics periodically disrupted due to flooding and clean-up operations.	ST: Minor Adverse LT: Moderate Adverse Production Products, Inc., relocated from the floodplain and the former site returned to more natural conditions. Disruption during relocation. Same statement as for Plan 1.	ST: Moderate Adverse LT: Moderate Adverse Disruption to creek and construction area aesthetics due to construction and plan implementation. Upper reach and confluence area of existing channel fabric formed concrete lined (1.5 acres). Diversion channel fabric formed concrete lined (2.5 acres). Vegetation retention, landscaping, and plantings.
Community Cohesion	ST: Minor Adverse LT: Moderate Adverse Continued periodic damages and disruption due to periodic flooding and associated problems.	ST: Moderate Adverse LT: Moderate Adverse Production Products, Inc., would be protected through relocation. Protection for single entity while remainder of community would continue to sustain flood problems.	ST: Moderate Adverse LT: Moderate Beneficial Generally, 100-year event level flood protection to existing community developments. Flood protection vs environmental impact concerns. Cost allocation concerns.
Cultural Resources	Potential cultural resources identified via survey studies. Potential disruption due to continued flooding and channel maintenance.	Location part of former Cheney Complex site. Some additional cultural resources investigation would likely be required if Production Products, Inc., were relocated.	Potential cultural resources identified via survey studies. Significance of potential cultural resources and alternate impacts being coordinated. Must be determined and mitigation measures (if necessary) accomplished before construction contract.

ST - Short Term
LT - Long Term

SECTION 3
AFFECTED ENVIRONMENT

INTRODUCTION

3.01 This section will briefly describe the study area existing and without project conditions.

ENVIRONMENTAL CONDITIONS (GENERAL)

3.02 The Limestone Creek watershed drains approximately 169 acres of land in Onondaga and Madison Counties, NY. The main branch of the creek flows westward from its source in northern Madison County till it joins the DeRuyter Reservior outlet, and then northward through the Villages of Manlius, Fayetteville, and Minoa in Onondaga County to its confluence with Butternut Creek, a distance of about 34 stream miles. The west branch flows northward from its source in the Town of Pompey to its confluence with the main branch in the Town of Manlius, a distance of about 10 stream miles. See Reference Figure 1, immediately following the EIS text.

3.03 The upper part of the watershed, above the Village of Manlius, is primarily rural with forested rolling hills bordering the creek valley which varies from about 1/2 to 1 mile wide in the section between Delphi Falls and Edwards Falls. Limestone Creek meanders through this fairly steep gradient area characterized by agricultural croplands, pasture and hay fields, abandoned farmland in varying stages of plant succession, densely wooded areas, and wetlands. The West Branch between Watervale and the Village of Manlius follows a more direct course through a narrow flood plain. The hilly terrain bordering the West Branch is generally agricultural, woodland, and openland.

3.04 The lower part of the watershed is suburban in character. Limestone Creek flows through the villages of Manlius, Fayetteville, and Minoa before joining Butternut Creek. Although there is considerable commercial and residential development in this section, there are many wooded, open, and wetland areas along the creek and within the flood plain. Limestone Creek from its source to the Village of Fayetteville (including the west branch) is recognized by New York State as one of the top 50 trout streams in the State.

3.05 The village of Manlius is located in the town of Manlius about 8 miles southeast of the city of Syracuse in central New York State. The Village is primarily residential with some scattered commercial and industrial areas. See Reference Figure 4. Because of its rural atmosphere and proximity to Syracuse, the village population has grown (22 percent) from 4,300 in 1970 to 5,241 in 1980. The greatest increase in land use has been for residential and some commercial/industrial development. while open and agricultural areas have decreased accordingly. This type of growth is expected to continue, although at a more moderate rate.

3.06 Both the main and the west branch of Limestone Creek flow through the village of Manlius, joining just outside the Corporate limits. Both have created flooding problems for Manlius in the past. The village is almost

completely developed in the flood hazard areas. See Reference Figure 2. There are 55 residences, four commercial, two industrial, and two public complexes within the 100-year event flood outline. This area provides housing for about 150 residents, employment for several hundred persons, and services to the entire community. Estimated project life average annual flood damages in the village are estimated at $417,600.

3.07 An important new industry is the cable television hardware manufacturing complexes operated by Magnavox and supplied by Production Products Inc. of Manlius. Production Products is located in the 100-year flood plain. Because of the current rapid growth of the market for cable television, its production cannot be replaced in the short term. Additionally, this industry provides significant employment for the community. Potential damage to Production Products accounts for a substantial portion of the estimated average annual damage.

3.08 Both the town and the village of Manlius participate through State policy in the national flood insurance program. Once the program policies and zoning measures are fully implemented and properly enforced; future development of unprotected structures should be limited in the flood plain (100 year) and potential significant flood damages to any future developments should be greatly reduced.

SIGNIFICANT RESOURCES
EXISTING AND FUTURE CONDITIONS

3.09 The following items are identified as significant resources that were evaluated, but are not identified as significant to the project area, nor significantly affected by implementation of any of the most feasible alternatives. They are: air quality, wetlands, wildlife, endangered species, agriculture, and noise. These items are discussed briefly in the following sections.

3.10 The following items are identified as significant resources that were evaluated and are significant to the project area and/or could be affected (adversely and/or beneficial) with some significance by implementation of one or any of the most feasible alternatives. They are: topography and materials, water quality, benthos, vegetation, fisheries, community and (local) regional growth (man-made resources), business and industry, employment and income, recreation, public facilities and services, property value and tax revenue, aesthetics, community cohesion, and cultural resources. These items are discussed in some detail.

3.11 The following sections briefly describe existing and anticipated future conditions for the natural and human environments, and cultural resources. Each section first describes general regional characteristics; then, where necessary, characteristics more specific to the immediate project area. See Reference Figures 1 and 2 which immediately follow this EIS.

NATURAL ENVIRONMENT (NATURAL RESOURCES) - EXISTING/FUTURE CONDITIONS

3.12 Topography and Materials - The County's topography is varied and picturesque. The Plain Region to the north is extremely flat and is characterized by numerous freshwater wetlands varying in size from a few acres to over 5,000 acres. The southern Upland Region is characterized by a series of well-defined stream valleys flanked by steep forested slopes running in a north-south direction. This, in conjunction with the numerous lakes, creates several scenic corridors and vistas. The largest lakes in the county include Skaneateles and Otisco Lakes in the southwest, Oneida and Cross Lakes in the nortneast and northwest respectively, and Onondaga Lake in the central portion of the county adjacent to the city of Syracuse. A large number of unique land formations are found in the county - the result of glacial action. Drumlins are characteristic of the midsection of the county between the Northern Lowlands and the Southern Uplands.

3.13 The major mineral resources available in Onondaga County include limestone, sand, gravel, and salt. Historically, it was the salt deposits that contributed to Syracuse's growth. Limestone, sand, and gravel are essential for urban growth - primarily for the construction of modern highways and buildings. The County is the largest producer of limestone in the region; both the salt deposits and the limestone are plentiful and are extensively used in local industrial processing.

3.14 Air Quality - The New York State Department of Environmental Conservation (NYSDEC) has classified the area in which the project is located as having a Level II air quality standard. The level II classification is indicative of predominantly single and two family residences, small farms, and limited commercial services and industrial development. (Title 6, Official Compilation of Codes, Rules, and Regulations of the State of New York, Subchapter A of Chapter III, Environmental Conservation Law, Air Resources).

3.15 Although moderate pressure for future similar type developments is expected to continue in the project vicinity, these types of developments would not be expected to significantly alter the air quality standards for the project vicinity. The ambient air quality data for the Manlius locale meets or is within the allowable maximum Federal and State standards for total suspended particulates, sulfer dioxide, carbon monoxide, ozone, nitrogen dioxide, lead, sulfates, and nitrates as indicated by NYSDEC (memorandum on Quarterly Evaluation of Ambient Air Quality and Compliance with Ambient Air Quality Standards NYSDEC 1982).

3.16 Water Quality - The New York State Department of Environmental Conservation assigned classifications and quality standards for the waters of Limestone Creek according to best usage. The Main Branch from the source to the outlet of Pond 138a (the reservoir upstream from Edwards Falls) is designated as having an ambient water quality classification of B(t). Class B waters are suitable for primary contact, recreation, and other uses except as a source of water supply for drinking, culinary, or food processing purposes. The symbol (t) means that these waters are trout waters and the dissolved oxygen specification of not less than 5.0 ppm applies. The stream

in this area is flowing through a primarily rural and forested country side where pollution is limited to agricultural and small residential sources.

3.17 From the outlet of pond 138a, to the New York Route 5 crossing in Fayetteville, the waters are designated as having an ambient water quality classification of C(t). Class C waters are suitable for fishing and any other uses except primary contact recreation and as a source of water supply for drinking, culinary or food processing purposes. The stream in this area flows through some rural area, the village of Manlius, and part of the village of Fayetteville.

3.18 The West Branch, which converges with the Main Branch in the Village of Manlius also carries a C(t) ambient water quality classification for its entire length. Like the upper reach of the Main Branch, it also flows through a primarily rural and forested country side. The ambient coliform bacteria, ph, total dissolved solids, and dissolved oxygen levels are within the specification standards for B(t) and C(t) waters set by New York State for this creek and its tributaries in the project locale (NYSDEC 1983). These specifications are on file at the Buffalo District Corps office.

3.19 From the New York Route 5 crossing to the mouth of the main branch at the confluence with Chittenango Creek, the waters are designated C. Water quality in this part of Limestone Creek reflects the discharges from the Meadowbrook-Limestone sewage treatment plant and the Minoa Village sewer treatment plant.

3.20 Less developmental pressure is expected in the upper reaches of the watershed. This, and increased public concern for maintaining the valued quality of the aquatic resources in these reaches, would indicate potential for less impact on creek water quality in the upper reaches of the Main and West Branches of Limestone Creek for the project future. With some further development in the vicinity of the Villages of Manlius and Fayetteville, water quality in the middle reaches of the Creek may decrease slightly due to increased effects of urban run-off. The water quality classification in this middle reach however, would not be expected to change in this area for the project future. Similar developmental effects would be expected in the reach downstream from Fayetteville. However, as a result of the recent and planned improvements in waste water treatment, improvement in water quality in this section of the creek is anticipated.

3.21 Benthos - Limestone Creek supports a variety of benthic organisms. Primary benthos information specific to the project areas was collected by the U.S. Fish and Wildlife Service and Corps personnel while conducting detailed biological field studies during 1982. During this study, at least 68 different invertebrates from 35 different groups were identified and listed. Flies and midges as a group made up 44 percent of the invertebrate population (midges accounting for 36 percent and black flies for 7 percent) followed by crustaceans at 22 percent, mayflies at 13 percent, caddisflies at 13 percent, mollusks at 4 percent, and worms at 2 percent. Scuds, crayfish, stoneflies, mayflies, caddisflies, black flies, and midges were collected at nearly every Mainstream and West Branch station. Crayfish were observed at

every Mainstream and West Branch station except one. Overall 2,769 invertebrates were collected from the study area which is an average of 151 individuals per station sampled. Reference Table 4.

3.22 Similar stream channel configuration, in-stream structure and substrate, variable instream flow regime, water quality, aquatic and riparian vegetation, and forage base would continue to provide for a superb aquatic habitat and benthos population in the upper and middle reaches of Limestone Creek. Any significant alteration to these criteria, however, could in turn adversely affect the benthos populations in the altered areas. In the upper reaches of the creek, where developmental pressures are less, alteration to the aquatic environment and associated adverse impacts would be less likely. Disruptions and/or alterations in the middle reach of the creek, however, would be more likely. Continued periodic flooding problems in the villages of Manlius and Fayetteville could result in further emergency or maintenance restoration (some clearing and snagging, channelization and minor levee and berm reconstruction) similar to those initiated locally after the 1981 flood. These actions, in addition to any adverse effects caused by the flood itself, resulted in some immediate short-term adverse impacts. Benthos in the immediate construction and downstream area were either destroyed or disrupted due to increased in-stream siltation, removal of vegetation, substrate excavation, and alteration of existing channel configuration. Although probably not to the degree of the pre-action condition, the area benthos would likely reestablish over the long term. This likelihood is reinforced by the presence of abundant benthos species identified in the 1982 fisheries field study which was conducted during and soon after the emergency action.

3.23 Vegetation - Lands adjacent to Limestone Creek in the upper part of the watershed above the Village of Manlius, are predominantly agricultural croplands, hayland, pasture land, abandoned farmland (in various stages of plant succession), woodland, and some wetland. The lower sections of the watershed encompass the developed areas of Manlius, Fayetteville, and Minoa, and also include active and abandoned farmland, wooded areas, and wetlands. The entire length of the creek is bordered by a nearly continuous band of riparian vegetation which provides wildlife habitat and stream cover. Along most of the creek, this riparian growth remains intact despite the agricultural, residential, and commercial development. The creek banks are typically tree overstory with interspersed shrubs and herbacious plants in the understory containing such species as black willow, box elder, cottonwood, red maple, slippery elm, sycamore, black locust, dogwood, sumac, choke cherry, wild cucumber, goldenrod and teasel. Reference Table 4 in the USF&WS Final Coordination Act Report. Wooded areas on the surrounding hillsides are predominantly northern deciduous hardwoods with scattered conifers. (U.S. Fish and Wildlife Service Coordination Act Report).

3.24 Change in terrestrial vegetation is generally relative to change in land use. Natural vegetation is usually partially, or completely removed to facilitate most types of land use activities. However, where possible, a narrow bank of riparian vegetation may be left along the creek, as natural stream bank stabilization and cover. In the upper reaches of Limestone Creek - with less developmental pressure and desired preservation of existing

aquatic resources - land use and riparian vegetation would be expected to be similar to existing conditions for the project future. In the middle reach, near the villages of Manlius and Fayetteville, a narrow band of riparian vegetation may remain intact. In some areas, however, expanded developments (i.e., parking lots, small berms) could further infringe upon this vegetation. Some riparian vegetation might also be removed in these areas if periodic flooding continues and further emergency or maintenance restoration measures (clearing and snaggng, channelization, and minor levee and berm reconstruction) similar to those implemented after the 1981 flood are required. Further development and proper implementation and enforcement of flood insurance and flood plain management measures would contribute toward preserving riparian vegetation in the future.

3.25 Wetlands - Wetland areas have been identified, mapped, and categorized in Onondaga County by the New York State Department of Environmental Conservation (NYDEC) and the County Environmenal Management Council. No wetlands are identified in the immediate Manlius project vicinity.

3.26 Fisheries - The U.S. Fish and Wildlife Service and the New York State Department of Environmental Conservation report that about 27 miles of the Main Branch of Limestone Creek (from Tributary Five in the village of Fayetteville to the source) supports a high quality cold water fishery and has been placed among the top 50 trout streams in New York State. The entire length of the West Branch also supports a cold water fishery. Excellent stream cover and fisheries habitat are found along these reaches. A nearly continuous band of riparian shrubs and hardwoods provide cover and maintain stream temperatures. The stream bottom is gravel and rubble stone with larger rocks and boulders providing riffle and pool areas. Gravel shoals provide areas for spawning. The stream width is generally about 25 to 30 feet with depths varying from a few inches to several feet. The lower section of Limestone Creek below Fayetteville is characterized by a deeper, wider channel (up to 60 feet across) with tree lined banks. This section is more characteristic of a warmwater fishery although trout have been found between the New York Route 5 crossing in Fayetteville and the Barge Canal. (USF&WS - Coordination Act Report).

3.27 Brown trout are most common in the West Branch. Brown trout (stocked and wild populations), rainbow trout, and brooktrout are found in the Main Branch. Stocking information for 1978 was provided by NYSDEC. The Main Branch between Butternut Creek and Delphi Falls was stocked with the following: 12,300 brown trout yearlings, 972 brook trout yearlings, and 520 rainbow trout spring fingerlings. The West Branch between the mouth and Watervale was stocked with 2,400 brown trout fall fingerlings. Stocking efforts for 1979 were about the same and a similar program is planned for these sections in the future. (USF&WS - Coordination Act Report).

3.28 Fishing pressure on both the Main Branch and the West Branch is substantial. A statewide angler survey was conducted by NYSDEC during 1976-77. An estimated 28,188 annual angler days was reported for Limestone Creek. The Main Branch of Limestone Creek is designated as a public fishing stream from Tributary 19 to the Town of Fabius borderline. NYSDEC has obtained public fishing rights along 11.62 miles of the creek.

3.29 In 1982, the U.S. Fish and Wildlife Service working with the Corps of Engineers environmental personnel conducted more detailed baseline (primarily fishery and benthos) studies specific to the project vicinities (Manlius and Fayetteville). The 5.5 miles of the Main Branch and 1.44 miles of the West Branch in the studied areas are bounded downstream by the Feeder Canal Dam in Fayetteville, and upstream by Edwards and Brickyard Falls respectively. Based upon this study, the U.S. Fish and Wildlife Service stated in their January 1983 report:

> "...it would appear that from a biological standpoint, the Mainstream and West Branch of Limestone Creek upstream of the Feeder Dam and downstream of Edwards and Brickyard Falls are important viable resources, particularly for trout and associated species. Additionally, two tributaries, Tributary Nine and the West Branch Tributary north of NYS Route 173, provide spawning and nursery area for trout which use the area described above. Moreover, it would appear that Bishop Brook, another tributary, also supports an indigenous trout population. The importance of these areas is further enhanced by their occurrence within a highly urbanized area such as that presented by the Fayettevile-Manlius, New York area...."
>
> "...The areas not mentioned above are also important. The area downstream of the Feeder Dam supports it's own population of organisms. The single trout taken at Station MS15 is conjectured to have passed over the Feeder Dam inadvertently. This area and others, particularly those upstream of the Feeder Dam, in the presence of sufficient flow provide nursery area for prey species and resting and feeding area for all fish species. Additionally, the value of this area is not limited to just the fish species found within the stream, but to all organisms found in the study area or which pass through at any given time..."

3.30 In addition to the trout species mentioned previously, the following species were collected by the USFWS during sampling in 1982: chain pickerel, cutlips minnow, bluntnose minnow, blacknose dace, long nose dace, creek chub, fallfish, pearl dace, white sucker, northern hog sucker, stonecat, banded killifish, rock bass, pumpkinseed, fantail darter, mottled sculpin, and slimy sculpin. The ratio of trout to non-trout species varies from 1:1 in the tributaties to 1:25 in the Main Branch. Reference Tables 2 and 3.

3.31 While there is no formal fisherman access in the project area or the area influenced by it, informal access is obtained at the several road crossings, the Village of Manlius Park, and some private properties such as P&C Foods. A specific number of angler-use days is unavailable. However, fishermen were observed by USFWS personnel during the 1982 field studies. In fact, the reach of the Main Branch to be significantly altered - on the basis of discussions with fishermen - is an apparent favorite of local fishermen. (USF&WS - FCAR dated 5 Oct 83).

3.32 The quality of the cold water fishery resources in the upper and middle reaches of Limestone Creek are well known (particularly by the State of New York) and continued significant efforts to preserve this resource would be expected. A continued significant complimentary stocking program is also anticipated. In preserving this resource, the excellent physical characteristics and quality of the stream which provide for the superb aquatic habitat and fishery population must be sufficiently preserved. Any significant alteration of this resource could in turn adversely affect the fisheries of the creek. In the upper reaches of the creek - with less developmental pressure anticipated - the aquatic habitat can more likely be preserved, and conditions similar to those that now exist would be expected for the project future. In the middle reach of the creek which flows through the villages of Manlius and Fayetteville, some further developmental pressures would be expected, which could adversely affect the aquatic habitat and thus the fisheries in the area (i.e., increased urban run-off, removal of riparian vegetation). Also, with continued periodic flooding problems, emergency or maintenance restoration actions (some clearing and snagging, channelization and minor levee and berm construction) similar to those inacted after the 1981 flood, might occur. This would periodically disrupt and adversely affect the aquatic environment, and, therefore, the fisheries. Although the benthic and fishery resources would be expected to recover to some degree from these measures, aquatic habitat quality would probably be decreased. Further development and proper implementation and enforcement of flood insurance and flood plain management measures, on the other hand, would serve to contribute toward preservation of the creeks remaining aquatic environment and in turn the fisheries regime.

3.33 Wildlife - There have been no known recent detailed surveys of wildlife conducted within the immediate project areas. However, Alexander (1974) listed 266 bird species, 52 mammal species, and 39 species of reptiles and amphibians present or known to have been present in Onondaga County. The riparian, openland, woodland, and wetland areas throughout the Limestone Creek watershed provide suitable habitat for many of the species listed. The nature of the narrow band of riparian vegetation along the banks of the Mainstream, West Branch, and Tributaries of Limestone Creek provide excellent habitat for a variety of wildlife. Additionally, riparian vegetation provides a valuable corridor for wildlife that venture through the area to connecting cover, and surrounding resting, breeding, and feeding habitats. Some wildlife species observed during 1982 field studies include mammals such as white-tailed deer, raccoon, muskrat, and eastern cottontail rabbit. Birds observed include mallard duck, crow, and a number of songbird. (USF&WS - Coordination Act Report).

3.34 The presence of wildlife is largely dependent upon the existence of suitable habitat, which in turn is related to land use and human activities. In the upper reaches of Limestone Creek, with less developmental pressure anticipated, the habitat situation would be expected to remain similar to that which presently exists. Some reemergence of natural field and shrub vegetation on abandoned or idled farmland would probably even improve habitat conditions. In the middle reach of the creek - in the vicinities of Manlius and Fayetteville - some further development or redevelopment may contribute

toward additional reduction of habitat and displacement of wildlife. With further implementation of flood insurance and flood plain management measures, however, this adverse type impact in the immediate flood plain areas might be expected to reverse in the future.

3.35 Protected Species - In compliance with Section 7 consultation under the Endangered Species Act (87 Stat. 884, as amend; 16 U.S.C. 1531 et. seq.), correspondence dated April 26, 1982 from the U.S. Fish and Wildlife Service stated that; except for occasional transient species, no federally listed or proposed threatened or endangered species under the jurisdiction are known to exist in the project impact area. New York State Department of Environmental Conservation (Delmar, NY) was contacted on 25 April 1983 and they indicated that there was no critical or significant habitat in the Manlius area, and the project should have no adverse effect on any endangered species.

HUMAN ENVIRONMENT - EXISTING/FUTURE CONDITIONS

3.36 Community and Regional Growth and Development - The primary area for growth in Onondaga County is in the north, with lesser growth in the east and west and little growth in the southern portion of the county. This growth pattern is largely attributed to the influence of the Syracuse metropolitan area. The county population experienced a slight loss in population between 1970 and 1980 and only light to moderate growth would be expected in the near future.

3.37 The Town of Manlius is a residential growth area, primarily around the Village of Manlius. In the town of Manlius, moderate growth in residential and commercial and slight growth in transportation and industrial land use is expected. Recreational land use should remain fairly stable, while agricultural and openland use are expected to decline relative to developmental activity. Both the Town and Village of Manlius experienced moderate growth in population between 1970 and 1980, but less than expected. Continued moderate growth for the vicinity is expected for the near future.

3.38 With respect to flood plain developments, in accordance with State policies, both the Town and Village of Manlius participate in the Federal flood insurance program sponsored by the Federal Emergency Management Agency. Under this program, flood insurance and flood plain management policies will help to compensate the communities and its residents for flood damages and help to reduce the potential for flood damages to any future community developments. This is a long-term program, however, and does little to protect many existing community flood plain developments from sustaining periodic flood damage and disruption. In most cases, these existing flood prone developments are important to the community functional base, growth, and well being. Therefore, many communities (with limited resources) express their desire to protect these existing developments (where possible) by requesting assistance through their local and Federal representatives. The general desirable developmental trend has, therefore, become to protect significant existing community and regional developments where feasible and environmentally acceptable and to promote improved flood plain land use management practices for the future.

3.39 Note: The followinng sections discuss in more detail parameters pertaining to community and regional growth and development.

3.40 Population - Reference Table 5 depicts some general population characteristics for Onondaga County, the Town of Manlius, and the Villages of Manlius and Fayetteville based on 1980 census data. In the Town of Manlius, a majority of the population (79 percent) reside in urbanized areas. The population is predominantly white (98 percent); 48 percent male, 52 percent female; with a median age of 32 and approximately 9 percent of the population at 65 years of age or older. Population characteristics for the Villages of Manlius and Fayetteville are fairly similar. Reference Table 5.

3.41 Land Use and Development (Man-Made Resources) - Reference Table 8 depicts existing and projected land use (in acres) for Onondaga County and the Town of Manlius. Figure 3 depicts existing and anticipated future land use areas in the project vicinity of the Town of Manlius.

3.42 In the immediate Manlius project vicinity, the flood hazard area is almost completely developed. As noticable on Reference Figure 4, approximately 1/3 of the 100-acre project area flood plain is developed commercial/industrial, 1/3 is developed residential, and the rest is open. There are 55 residences, 4 commercial, 2 industrial, and 2 public developments within the 100-year event flood outline. This area provides housing for approximately 150 residents, employment for several hundred persons, and services to the entire community.

3.43 Residential - Reference Table 10 depicts general housing characteristics for Onondaga County, the Town of Manlius, and the Villages of Manlius and Fayetteville. In the Town of Manlius, approximately 98 percent of the year-round housing units are occupied and only 2 percent vacant. Most of the year-round housing units are in good condition, approximately 99 percent with complete plumbing, with a median value of approximately $50,000 (1980). Median contract rent for specified: renter - occupied housing units paying cash rent is $233. Housing characteristics for the Villages of Manlius and Fayetteville are similar.

3.44 Based on a 1980 survey, single home housing structures in the project area flood plain range in value from approximately $9,000 to $77,000 with an average (mean) value of approximately $35,900. They range in age from about 5 to 90 years old with an average (mean) age of 33 years and a median age of 15 years old. Those located along West Brook Circle and Brook Hill Drive have an average value of about $45,900 and are about 15 years old.

3.45 Business and Industry - Onondaga County, the most populous county of the Syracuse Metropolitan Area, has diversified manufacturing industries which employ highly skilled workers. Most of the factories are located in or near Syracuse and produce such items as electronic equipment, blowers, conveyors, air tubes, pallet loaders, air conditioners, men's clothing, chinaware, decorative wall accessories, floodlights, electrical wiring devices, automotive gears, metal stampings, non-ferrous castings, portable electric power tools, roller bearings, specialty steels, truck and safety lighting equipment, chemicals, and pharmaceuticals. A notable trend, however, in the

County economy, is a decline in the manufacturing sector while the service sector is increasing in importance.

3.46 Syracuse is situated at the intersection of valleys running north and south and east and west. The exceptionally fertile soil in the valleys makes Onondaga County outstanding for quality and variety of its farm products. As a result of its strategic location, Syracuse is a hub for transportation and wholesale distribution. The city and county are served by several railroads and airlines, the New York State Thruway, the North-South Expressway, and numerous other highways. Water transportation is provided by sections of the Barge Canal. See Reference Figure 1.

3.47 Based upon national and state regional population and economic trends, continued growth in commerce and some shift from the manufacturing sector to the high tech and service sector is anticipated for the Syracuse Metropolitan area. Reference Tables 11 and 12. Related moderate growth and development is expected for the Town of Manlius and vicinity.

3.48 Commercial and industrial developments located within the project area 100-year flood plain include: a metal products manufacturer, a grocery store, a cleaners, a tax data processing business, a hair styling salon, a cable television components manufacturer (Production Products), and a gas station and convenience store. An important new industry is the cable television hardware manufacturing complex operated by Magnovox and supplied by Production Products, Inc., of Manlius. Potential damage to Production Products accounts for a substantial portion of the project area estimated potential average annual flood damage. Because of the current rapid growth of the market for cable television, Production Products production can not be replaced in the short term.

3.49 Employment and Income - Reference Table 11 depicts employment and income for the New York State, the Syracuse, and the Onondaga County vicinity (1978). In reference, in July 1978 the civilian labor force for Onondaga county consisted of some 214,300 persons, 201,400 of which were employed constituting an employment percentage of 94 perent. The income per capita at the time was $7,546. Comparatively speaking, the employment rate was higher for Onondaga County than for the Syracuse area and/or New York State. Per capita income was slightly higher for Onondaga County than for Syracuse area but slightly lower than New York State.

3.50 Reference Table 12 compares employment by sector for 1970 and 1978 in New York State, the Syracuse area, and Onondaga County. Although the manufacturing sector constitutes the greatest employment sector for the three areas, as stated in the Business & Industry section, the most notable trend illustrated by the table is the shift in employment from the manufacturing sector to the services sector. This type of transition is expected to continue.

3.51 In the immediate Manlius project vicinity, 4 commercial and 2 industrial developments are located in the flood hazard area (100-year flood plain). These establishments provide employment and income for several hundred persons.

3.52 Recreational Opportunities - Although land use projections do not indicate a significant demand for additional recreational lands in the County, demand for various recreational activities and associated facilities may change over time. In assessing the recreation potential for Onondaga County, the county found that many kinds of recreational areas and enterprises have a high potential for further development. Of particular interest specific to Limestone Creek is the creek's fisheries and associated fishing potential. Limestone Creek waters are evaluated as being among the top 50 trout streams in New York State. The State's Department of Environmental Conservation (DEC) and Trout Unlimited have fishing rights along 11 miles of Limestone and its West Branch and there are 14 DEC public access areas. The following were included in a county inventory (1968) of streams that have considerable recreational potential.

3.53

ONONDAGA COUNTY

Inventory of Lakes, Ponds, Reservoirs & Streams

Includes only those Lakes & Ponds of 10 Acres or larger and only those Streams that may have Recreational Potential

(Streams with low or intermittent flow or less than one mile in length excluded.)

All streams listed have constant flow. Beds of streams are composed of gravel, ruttle, sand and some silt. All trout waters generally are cool and shaded.

Name of Water	Location	Size	Present Use
Limestone Creek	Manlius, Pompey Townships. Flows into Butternut Creek	20 miles long; Av. width: 20' Av. depth: 24" Pools to 8'	Good fishing from Manlius to county line. Good access. Stocked with Brown trout. Very little posting. Canoeing.
Biship Brook	Manlius Township. Flows into Limestone Creek.	5.5 miles long; Av. width: 7' Av. depth: 5" Pools to 3'	Some Brown Trout fishing in lower section. Stocking policy stopped because of pollution from Fayetteville.
West Branch of Limestone Creek	Manlius, Pompey Townships. Flows into Limestone Creek west of Manlius.	10.2 miles long; Av. width: 14' Av. depth: 9" Pools to 3'	Good fishing for Brown Trout. Stocked with Brown Trout. Poor water above Route 20.
Pratts Falls Brook	Pompey Township. Flows into West Branch of Limestone Creek at Watervale.	4.5 miles long; Av. width: 7' Av. depth: 12" Pools to 2'	Good fishing both below and above the falls. Both Raintow and Brown Trout stocked. Access limited unless a person walks a great distance.
T-9 of Limestone Creek	Manlius Township. Flows into Limestone Creek in Manlius.	.8 miles long; Av. width: 4' Av. depth: 8" Pools to 2'	Fair fishing for Brook Trout. Good access. Stocked with Brook Trout
T-34 of Limestone Creek.	Pompey Township. Flows into Limestone Creek 1.5 miles north of Delphi.	3.2 miles long; Av. width: 3' Av. depth: 6" Pools to 2'	Fair fishing. Access good. Stocked with Brown Trout from mouth to Delphi & Brook Trout from Delphi to source. Fish that are caught are reported to be in excellent condition.
T-37 of Limestone Creek	Pompey, Fabius, Cazenovia Townships. Flows into Limestone Creek .3 miles below Delphi Falls.	3.6 miles long; Av. width: 14' Av. depth: 12" Pools to 5'	Good fishing. Access limited. Stream well shaded. Brown Trout stocked.

SOURCE: An Appraisal of Potential Outdoor Recreational Developments in Onondaga County, New York 1968; Onondaga County Soil and Water Conservation District, and Cooperative Extension Association of Onondaga County Agricultural Division.

3.54 Despite the extensive development in the project area flood plain, the creek maintains significant fishery (trout) resources value. This induces substantial fishing activities all along the creek. A town park is located just upstream of the project area which provides local outdoor recreational opportunities including fishing access. Reference the Fisheries section also.

3.55 Agriculture - Though agricultural land use and employment has been declining in Onondaga County over the past few decades, agriculture and agricultural products are still significant in terms of being a major income generating activity and in terms of being a convenient and important local source for various food types. In addition, the striking rural-urban nature of the County gives the area its character and diversity. Although some prime farmland mapping units have been identified within the immediate project area (Reference Figure 5), no portion of any county designated agricultural districts have been identified within the immediate project vicinity.

3.56 Public Facilities & Services.

3.57 Sewerage - Except for several incorporated villages, the development of sanitary sewerage facilities in Onondaga County is basically the responsibility of the County Department of Drainage and Sanitation. Major construction programs have been undertaken during the 1970's - in conjunction with water pollution control acts on the Federal level - to upgrade treatment levels in serviced areas as well as to substantially expand capacity to accommodate previously unserviced and newly-developing areas.

3.58 Considering current and planned capacities, by 1995 Onondaga County will have an approximate net surplus sewerage capacity of 10 mgd. This translates into a capacity to serve approximately 100,000 more people than has been projected for the County by 1995. It is anticipated that between 90 and 95 percent of the total County population will be served by municipal sewerage systems by 1995.

3.59 There are presently two sewage treatment plants discharging municipal sewage effluent into Limestone Creek. The last of the smaller independent facilities was eliminated in the summer of 1979. The Meadowbrook-Limestone Plant, located north of Fayetteville presently receives all sewage from Fayetteville and Manlius and has been achieving secondary treatment standards. The Minoa plant is a secondary treatment plant but has not been meeting secondary standards. Plans for further upgrading of the system are in the process.

3.60 Water - The County has an excellent water supply in terms of both quality and abundance. In the 1960's local business and government leaders supplemented the Skaneateles and Otisco Lakes sources (with respective maximum capacities of 57 mgd and 20 mgd) by undertaking a massive waterline project to tap into Lake Ontario. Efforts have been underway to expand the capacity of this system to 62 mgd to assure necessary reserves to allow for a whole range of potential development opportunities in the foreseeable future.

3.61 Police and Fire Protection - Within the Town of Manlius, the villages of Manlius, Fayetteville, and Minoa maintain their own police departments which also serve respective districts in the township. These services are also supplemented by the County Sheriffs Department and the New York State Police. Similarly, the villages of Manlius, Fayetteville, Minoa, and Kirkvile maintain their own volunteer fire departments which also serve respective districts in the township. Generally, existing services are very good. Further development is generally determined by demand, availability of resources, and ability of the community to meet the demands.

3.62 Property Values and Tax Revenue - See Residential also. Market values for developed properties within the 100-year event flood plain in the Town and Village of Manlius are comparable but generally less than similar developments in other areas of the community. This general depression of values may be attributed to the threat of periodic flooding. Undeveloped land is less valuable in the flood plain (for some types of developmental activities) since recent flood insurance and flood plain management regulations deter flood damagable type developments.

3.63 Significant community residential, commercial, and industrial property tax sources are located in the flood plain. These represent primary tax revenues to the village and town and the various service districts. Secondary revenues result from revenue sharing from State and Federal income taxes filed by area residents. These sources are negatively affected by periodic flood inundation.

3.64 Noise - Noise levels in the area are those associated with the residential and light commercial industrial developments in the vicinity. Several site visitations indicate that the most notable external noises generated in the vicinity are those from vehicular traffic along route 173 or from the flow of the creek itself. No severe external noise problems were noted or would be anticipated in the project vicinity.

3.65 Aesthetics - The aesthetics of the area is that associated with the Creek and riparian way and the residential and light commercial/industrial development in the vicinity. Most of the residential and commercial/industrial developments in the vicinity appear to be well maintained, despite the threat of periodic flooding. A few, however, still show the ravages of recent flood problems ("Oct 81"). The creek has been cleared and snagged and channelized to some extent since the last flood. Minor riprap protection, and some contouring, grading, seeding, and other restoration efforts were noted during recent (82-83) site visitations. Although restoration measures were noticeable, the view along the creek of the tree lined bank (usually a narrow band) and riffled stream flow is aesthetically pleasing. This could be altered adversely, however, with continued period flooding and associated disorder and cleanup.

3.66 Community Cohesion - Population and community development statistics indicate community cohessive characteristics in the community of Manlius. A majority of persons also indicated through project correspondence, work shops, and personal discussion; that the rural atmosphere, proximity to

Syracuse, and available community opportunities and service, make the community a desirable place to live. Most also agreed that some type of flood control project (measures) would be beneficial to the community as a whole. Of some considerable concern, however, are possible cost allocation impacts, and environmental impacts - particularly to the fishery resources of Limestone Creek.

CULTURAL RESOURCES - EXISTING/FUTURE CONDITIONS

3.73 Cultural resource studies were coordinated with cultural resource agencies including: the New York State Historic Preservation Officer (SHPO), the State Archaeologist, the U.S. Department of the Interior (DOI) - National Parks Service, the DOI - Interagency Archaeological Service, and the Advisory Council on Historic Preservation.

3.74 An initial cultural resources reconnaissance study (Pratt & Pratt) was completed in June 1982. It consisted of a background and literature search, an architectural assessment, and a field investigation. The background and literature search was designed to locate known cultural resources within the project area, and also to provide a basis from which to predict the probability of finding sites in the area during the field investigation. A number of sources were consulted, including the National Register of Historic Places, local histories, newspapers, archaeological reports, and various archives and documents. The architectural assessment included visual observation and assessment of each standing structure, a formal inventory of each structure containing specific significance, and photo documentation of "secondary" structures. For the field investigation, the study area was divided into five transects, and test pits were dug at 100-foot intervals along each transect. Each transect was walked and visually inspected, and the test pits were examined for subsurface disturbance. The typical soil profiles in the transects included brown or tan silty loam over rock, which varied in one transect from zero to an average depth of 12 inches. Many areas showed disturbance with modern fill or land modification. In addition, the crew members visually inspected the project areas on either side of the transects. Areas thought to have potential were then tested.

3.75 No sites within the project area are currently on the National Register of Historic Places, and no such properties have been nominated. The closest NRHP properties lie in the Manlius Village Historic District which is located, at the closest point, approximately 600 feet to the northwest of the northern boundary of the study area. While numerous sites occur in the region surrounding the study area, the amount of 19th and 20th Century disturbance limits the probablity of finding significant prehistoric, photo-historic and, historic Indian sites. Based upon the literature search, the potential for locating historic non-Indian sites is high. The locations of nine potentially historic sites have been identified within or near the project area. These include a circa 1700's turnpike (The Great Genesee Road); an 18th Century mill site; a rubble stone arched culvert related to an early machinery complex; raceways and a mill pond; the Chiney Complex (a diverse mid-1800's foundry complex); a mid-1800's dam; a 1920 concrete arch bridge; a stone-lined raceway and 12th Century artifacts, possibly related to an early mills facility; and a circa 1850 school house.

3.76 A supplemental cultural resources reconnaissance study with similar specifications is to be conducted along the proposed diversion channel alignment. This area was not specifically investigated in the initial cultural resources reconnaissance study. This study will include further coordination with the local historian relative to the significance of items identified in the studies that would be affected by implementation of the proposed project.

SECTION 4
ENVIRONMENTAL EFFECTS

INTRODUCTION

4.01 This section briefly describes the anticipated effects of each of the final plans on the previously described affected environment (resources). It describes in more detail the impacts identified in EIS Table 2 - Comparative Impacts of Alternatives located in SECTION 2 - ALTERNATIVES.

NATURAL ENVIRONMENT - ALTERNATIVE PLAN EFFECTS

Topography and Materials.

4.02 Plan 1 - No Action (Without Conditions) - As in the past, natural resources will continue to play an important role in the growth and development of communities in Onondaga County. The natural attributes of Limestone Creek are an important item in this spectrum. Significant natural attributes persist, despite past and continuing pressures for residential, commercial, and industrial development. With proper consideration, these resources would be maintained in the future. Proper implementation and enforcement of flood insurance and flood plain management policies should help to preserve the natural attributes of the creek and its riparian areas.

4.03 Plan 2 - Relocate Production Products, Inc. - Generally, anticipated conditions would be similar to those stated for Plan 1. However, with this alternative plan, the Production Products, Inc. facility would be relocated from the creek bank and re-established in another location. If the buildings were removed, the site would then be promptly graded, reseeded with a grass or grass-legume mixture, and planted with shrubs and/or trees. If a new facility was constructed, some existing terrestrial woody and herbaceous vegetation at the new site would probably be disrupted or destroyed at the relocation site. These impacts, however, would not be expected to be significant.

4.04 Plan 3 - Channelization with Fabric-Formed Concrete Erosion Protection - Implementation of this plan would require in-stream channelization for 3,475 linear feet to remove approximately 22,842 cubic yards of creek bed material. The upstream and downstream ends of the project would be lined with approximately 5,550 cubic yards of riprap and 2,500 cubic yards of fabric formed concrete material. The middle-reach of the excavated existing channel (below the diversion control structure) will be relined with several thousand cubic yards of new and/or previously excavated riprap and block material. A 1,300-foot long diversion channel will be constructed behind Tyler Court which will require removal of terrestrial vegetation along its entire alignment; also, approximately 24,800 cubic yards of earthen material would be excavated. This channel and confluence area will be lined with approximately 3,200 cubic yards of fabric formed concrete. Excavated material will be used for fill and landscaping in the immediate project vicinity, primarily in the diversion channel area. Construction of the diversion control structure

will require approximately 200 linear feet of steel sheet pile and about 300 cubic yards of backfill material. Construction of this alternative plan will require utilization of the previously mentioned resources (probably from local sources) and will disrupt the existing natural riparian topography in the project vicinity converting it to more man-made characteristics.

Air Quality.

4.05 Plan 1 - No Action (Without Conditions) - Air quality in the study area would continue to be about the same as described in paragraph 3.14. Since No Action implies that no Federal project would be constructed under this alternative, there would be no heavy construction equipment air emissions that could temporarily contribute to some minor air quality deterioration - except that associated with existing channel maintenance or possible emergency action measures.

4.06 Plan 2 - Relocation of Production Products, Inc. - Some temporary short-term minor adverse impact on air quality would likely occur due to exhaust fumes and fugitive dust caused by operation of heavy equipment during demolition and removal of buildings as well as grading of the site. Impacts to ambient air quality would be minor, short-term, and localized pertaining to some minor increase in hydrocarbons and fugative dust, with no significant adverse impact anticipated. Ambient air quality would return to existing conditions immediately after construction operations (memorandum NYSDEC-83).

4.07 Plan 3 - Channelization With Fabric-Formed Concrete Erosion Protection - Some temporary short-term minor adverse impact on ambient air quality would likely occur due to exhaust fumes and fugitive dust caused by operation of heavy equipment during creek channelization, vegetation removal, deposition of earth fill, grading of filled areas (on terrestrial land near the diversion channel and east of the Route 273 Bridge), removal of the house near the Route 273 Bridge, and installation of fabric-formed concrete and stone riprap. Possible construction equipment that may be used as needed could include bulldozer, blackhoe, scraper, dump trucks, highlift, and dragline. Similar equipment and short-term effects may be associated with future project maintenance. Ambient air quality would return to existing conditions immediately after construction operations (memorandum NYSDEC-83).

Water Quality.

4.08 Plan 1 - No Action (Without Conditions) - Water quality in the study area would probably improve over time as sewage treatment facilities are upgraded, and as public awareness and management of point and non-point source pollution run-offs improves. Perodic short-term adverse impacts of increased sedimentation and turbidity associated with continued occasional channel maintenance or possible emergency action measures could be expected.

4.09 Plan 2 - Relocation of Production Products, Inc. - Temporarily, some silt and sediment may enter the creek through surface water runoff from the building removal site, until the area either revegetates by natural plant

invasion and succession, or by planned seeding and planting. Also, some unavoidable short-term impact might occur from surface runoff possibly entering the creek that may include some oil or grease from use of heavy equipment on the site. No significant long-term impact to ambient water quality would be expected.

4.10 Plan 3 - Channelization With Fabric-Formed Concrete Erosion Protection - Some short-term degradation of water quality in the creek could occur due to a temporary increase in sediment load from construction disturbance of the creek channel, as well as along the banks during channelization excavation, filling, grading, and installation of fabric formed concrete and riprap. During instream placement of fabric-formed concrete, a limited amount of cement elutriate material may filter through the mesh form material into the water until the concrete hardens. However, such elutriate will probably dissipate quickly in the fast flowing creek, and should have no significant effect on the creek's water quality. Monitoring of pH in the near downstream vicinity during construction will help to facilitate assurances that the pH minimum and maximum ranges do not vary significantly from that found under existing ambient conditions. Impacts to ambient water quality would be moderate and short-term. Water quality would return to existing conditions soon after construction operations. Also reference the attached 404(b)(1) Evaluation Report and Public Notice, and Standardized Erosion and Siltation Protection Measures in the Environmental (EIS) Appendix.

4.11 Channelization and removal of some riparian shade tree and shrub vegetation could increase creek water temperatures to a degree. Some stream bottom areas may become shallower during low flow periods (due to widening), while other areas may be deepened. A low-flow channel will be provided in the project design, in order to allow for fish passage upstream and downstream during low-flow periods. Any potential increase in water temperature in unshaded creek areas is not expected to be significant because of the continuous exchange of water between unshaded and shaded zones in the continuous fast flowing creek.

Benthos.

4.12 Plan 1 - No Action (Without Conditions) - Similar stream channel conditions would continue to provide for quality benthic habitat. Continued periodic flooding problems in the Village of Manlius could result in further emergency or maintenance restoration measures similar to those initiated after the 1981 flood. These actions, in addition to any adverse effects caused by the flooding disruption could adversely affect the existing benthic habitat. On the other hand, if long-term effects of flood plain management measures were to result in some relocation of structural developments from the immediate creek vicinity, followed by eventual restoration to more natural conditions along the creek, such habitat within the Manlius vicinity could improve.

4.13 Plan 2 - Relocation of Production Products, Inc. - Overall, anticipated conditions would be similar to those stated for Plan 1; however, Production Products Corp. would be relocated from the flood plain. Immediate short-term adverse impacts could result from potential increased temporary sediment

runoff into the creek from disturbed soils, that could contribute toward disruption of some benthic habitat. If the Production Products Corporation is demolished, disburbed soils on this side would be graded, fertilized, and planted to reduce or prevent soil loss into the creek.

4.14 Plan 3 - Channelization with Fabric-Formed Concrete Erosion Protection - Stream channel alteration by excavation, grading, pumping of grout, placement of fabric formed concrete and placement of bank riprap (below water) will destroy existing invertebrate benthic organisms in the project zone. Existing channel substrate would be removed to obtain the engineering design grade, and any surviving benthic organisms would be covered over with fabric formed concrete and riprap. Some benthos may reestablish eventually in crevices of the fabric-formed concrete and riprap. The fabric-formed concrete would make the channel habitat more open and also less variable in substrate composition, than found under present existing natural conditions. Therefore, a significant reduction in invertebrate population and variability along the fabric-formed concrete lined channel would be anticipated.

4.15 Excavation to divert a portion of Tributary 9 would destroy existing invertebrates over about 600 square feet of this tributary. The whole new excavated tributary bottom and bottom of the newly installed culvert would be lined with gravel, in order to simulate bottom habitat conditions as much as possible. Shortly after construction ceases, invertebrates from upstream would begin recolonizing the newly created habitat. Total bottom area of Tributary 9 would be increased, with a subsequent probable increase in benthos.

Vegetation.

4.16 Plan 1 - No Action (Without Conditions) - In the Manlius vicinity, much of the creek is bordered by a narrow band of riparian vegetation which provides a wildlife habitat travel lane and stream cover. This still remains intact, despite the existing residential and commercial/industrial developments. Much of this riparian vegetation would be expected to continue to remain intact, however, in some areas future development expansion (i.e, parking lots, small berms, etc.) could further infringe upon this vegetation. Some riparian vegetation might also be removed if flooding continues periodically, and further emergency or maintenance restoration measures similar to those implemented after the 1981 flood, are required. If long-term effects of flood plain management measures were to result in some relocation of structural developments from the immediate creek vicinity, with eventual restoration to more natural conditions, then increased riparian vegetation establishment would probably occur.

4.17 Plan 2 - Relocation of Production Products, Inc. - Overall, anticipated conditions would be similar to those stated for Plan 1. Production Products, Inc., however, would be relocated from the flood plain. If the Production Products' buildings were demolished, the site would be graded, fertilized, and planted to herbaceous and weedy vegetation. Some natural vegetation would also reinvade the creek banks.

4.18 Plan 3 - Channelization with Fabric-Formed Concrete Erosion Protection - There will be a loss of approximately 1.5 acres of riparian vegetation along the creek where construction occurs to install fabric-formed concrete and riprap as well as the new bridge. Also, about 2.5 acres of terrestrial vegetation consisting of some hardwood trees, shrubs and herbaceous grasses, and forbs would be destroyed by construction along the alignment of the diversion channel. NOTE: Much of the terrestrial vegetation (trees, shrubs, and herbaceous weeds) at and in the near vicinity of the proposed diversion channel site was cut out and removed from the site recently by property owners. Since approximately a total of 7.5 acres of terrestrial area would be filled on both sides of the diversion channel during construction of the project, it is likely that any vegetation that reestablished between the time of the aforementioned clearing and construction would be covered over by fill material when the project is installed. The filled area would be replanted with herbaceous and woody vegetation. Similar impacts and replanting would also occur at the house removal site, where about .5 acres would be disrupted and filled (if needed). Removal of existing riparian vegetation overhanging the creek would decrease stream shade, which would expose the creek to more direct sunlight, thereby potentially increasing creek temperature and decreasing dissolved oxygen to some degree in the vicinity of the construction site. This could decrease the value of the creek's aquatic habitat in the project area for salmonids and associated forage fish. The actual change in temperature would be a function of several factors including: (a) the rate of the volume of water moving through the exposed area (exposure time), (b) the depth and surface area of the flowing water, (c) intensity and heat retention characteristics, (d) air temperatures, etc. In the Manlius portion of Limestone Creek, the exposure time of a specific volume of stream water during normal flows would be about 1 minute. The very brief exposure time should result in a small, perhaps immeasurable difference in mean water temperature. Some of this riparian vegetation habitat would be replaced with riprap or fabric-formed concrete for the life of the project, and some would be replaced by low growing herbaceous grass-legume plantings and invaded natural vegetation where disturbed soils did not require riprap or fabric formed concrete. Vegetation retention and planting measures will help to compensate for vegetation lost. Reference the General Environment Scheme in the Environmental Appendix following the EIS. (Attached).

4.19 Aquatic vegetation consisting primarily of filamentous algae clinging to rocks would be destroyed by channelization, grading in the channel, and installation of fabric-formed concrete and riprap. Some of this algal growth would probably reestablish on the new substrate installed below water.

Wetlands.

4.20 Plan 1 - No Action (Without Conditions) - There are no wetlands in the project vicinity, therefore, this action would not have an impact on this resource.

4.21 Plan 2 - Relocation of Production Products, Inc. - Same as indicated for aforementioned Plan 1.

4.22 Plan 3 - Channelization with Fabric Formed Concrete Erosion Protection - Same as indicated for aforementioned Plan 1.

Fisheries.

4.23 Plan 1 - No Action (Without Conditions) - Since No Action implies that no Federal project would be constructed under this alternative, the fishery in Limestone Creek would remain essentially the same, as described in paragraphs 3.26 through 3.32 of the Existing and Future Conditions Section of this report. Some clearing, snagging, riprapping, and channelization has already recently occurred on Limestone Creek at the local level. This would probably continue to occur on an as-needed basis in the future to clear out sediment, stone, and snag deposits in order to reduce the possibility of flooding. Such disruption of fish habitat would probably continue. Stocking of Salmonids by the New York State Department of Environmental Conservation will likely continue.

4.24 Plan 2 - Relocation of Production Products, Inc. - Although some fish in the creek may be disturbed temporarily by silt, sediment, oil, and grease runoff contributed by construction and heavy equipment use on the project site; if the Production Products' buildings were demolished, the area presently occupied by the company would probably be restored to a more natural setting, which would provide some additional riparian habitat and/or fishing access to the area.

4.25 Plan 3 - Channelization With Fabric-Formed Concrete Erosion Protection - Construction activity in the water and on adjoining banks will tend to drive fish out of the project site. Some small fish may even be destroyed by channelization and deposition of fabric-formed concrete and stone material put into the creek. Temporary increased siltation may disturb fish gill systems. Due to loss of existing benthic habitat, a corresponding reduction in use of aquatic habitat by indigenous fish on areas disrupted in the creek would be anticipated - especially in areas covered over by fabric formed concrete. Natural substrate cover and feeding areas provided by diversity of pools and riffle zones, boulders, and cobble stones would be lost. Fish access through the project creek channel to both upstream and downstream areas would still be possible. However, since the surface area of fabric formed concrete is more uniform and much less diverse than the existing natural substrate, fish use of this artificial habitat would likely be lower. Design and construction will incorporate a low-flow channel and some riffle/pool zones into channelized portions of the creek to provide for fishery access through the area. The same type of environmental design measures would apply to the confluence area downstream in the project zone.

4.26 Fishery access between the lower and upper reach of the creek project zone (between the fabric-formed concrete in the existing channel and the confluence of the Main and West Branch) would be maintained via an open low-flow control structure (approximately 50 feet long and 20 feet wide of close to level gradient) and the existing channel. All flows to about 400 cubic feet per second would pass through this structure and into the existing channel. Flows greater than about 400 cfs would be diverted by the control structure both through the existing channel and into a 1,200-foot long concrete-lined diversion channel

to be constructed over a terrestrial land area behind Tyler Court. The diversion channel may provide some very short-term fishery habitat during high flow periods.

4.27 The flow of Tributary 9 would be diverted to run parallel to Limestone Creek, from a point near its natural mouth to a point about 300 feet downstream. In order to maintain a gradient for future fish access, the rerouted tributary bottom elevation would vary from about 3 feet to 8 feet beneath the existing ground elevation. An apartment complex utility building will have to be moved because of its proximity to the rerouted tributary. The bottom surface width and gradient of the rerouted tributary would be constructed similar to the existing tributary; also, gravel and sand material would be placed on the newly constructed bottom surface of the tributary and its associated culvert, to similate existing conditions. The tributary will enter the existing channel downstream of the diversion control structure near the bottom elevation of the existing main channel. Although diversion of Tributary 9 would cause a loss of about 600 square feet of existing fish habitat, about 3,500 square feet of new fish habitat would be created. Also, planting of grass/legume herbaceous vegetation and shrubs along the tributary bank slopes - above the maximum designed stream flow capacity elevation - would help mitigate for loss of natural stream shade cover.

4.28 During construction diversion of a small portion of existing tributary 9, there will be temporary disruption to free movement of fish between it and the main stem of Limestone Creek.

Wildlife.

4.29 Plan 1 - No Action (Without Conditions) - Since No Action implies that no Federal project would be constructed under this alternative, wildlife habitat would remain about the same, unless local development eventually intruded into the riparian vegetation now utilized by mammal and bird wildlife for food, nesting, and cover. Much of the riparian vegetation zone along both banks of the creek is located on steep abrupt slopes which would tend to discourage development and clearing; therefore, it is likely that this zone would continue to be utilized by wildlife as a travel lane.

4.30 Plan 2 - Relocation of Production Products, Inc. - If the Production Products' buildings are demolished and removed, the disturbance created by construction activity would tend to temporarily drive wildlife out of the project zone until such mechanical activity ceased. However, creation of more "greenspan" by removal of buildings and associated parking facilities could eventually create more wildlife habitat as natural plants either reinvade the disturbed graded soils, or as planted grasses, legumes, trees, and shrub vegetation established.

4.31 Plan 3 - Channelization With Fabric Formed Concrete Erosion Protection - About two acres of terrestrial riparian wildlife habitat consisting of hardwood trees, shrubs, grasses, forbs, and some sedge would be destroyed along the Main creek channel or its tributaries during channelization, riprap, and fabric-formed concrete installation. Approximately 3 acres of terrestrial non-riparian habitat would be destroyed where the high flow diversion channel

work is constructed. Disturbance created by construction activity would tend to temporarily drive wildlife out of the project zone until such mechanical activity ceased. Some small rodents or their dens (i.e., mice, moles, voles, woodchuck, burroughs, etc.) may be destroyed or covered during bank channelization, riprap installation, and fabric-formed concrete placement. Much of the natural terrestrial wildlife habitat provided by shrubs, herbaceous weeds, and tall trees had been destroyed when the area in the vicinity of the proposed diversion channel behind Tyler Court was recently cleared and grubbed by property owners. Any terrestrial vegetation - both woody and herbaceous - that establishes between the time of the aforementioned clearing and construction of the project, would probably be covered over by fill material that was removed from the proposed high-flow diversion channel. Once the earth-filled area in the vicinity of the diversion channel and at the site of the removed house (near the Route 273 Bridge) was graded and planted, the herbaceous planted vegetation would provide some low-growing open-land type wildlife habitat of limited value to birds and small mammals. Scattered plantings of trees and/or shrubs would eventually provide potential habitat for birds and perhaps some tree-climbing mammals (i.e., squirrels, raccoon).

HUMAN ENVIRONMENT - ALTERNATIVE PLAN EFFECTS

Community and (Local) Regional Growth.

4.32 Plan 1 - No Action (Without Conditions) - Moderate population growth is anticipated for both the town and village of Manlius. In the town of Manlius, moderate growth in residential and commercial and slight growth in transportation and industrial land use is expected. Recreational land use should remain relatively stable, while agricultural and open-land use are expected to decline relative to development activities. Less developmental pressure is anticipated in the more rural upper reaches of the creek than in the more urbanized area around the village of Manlius. Any new or redevelopment in the flood plain area would need to comply with flood insurance and flood plain management policies now in effect. This, in the long term, should promote better utilization of flood plain areas and benefit interests in preserving or promoting more natural and/or recreational utilization of flood plain corridors.

4.33 Flooding has been and continues to be a substantial problem in the village of Manlius. Reference relative sections of this report for specific detail. Substantial flood damage reduction measures could not be implemented at the local level. Limited floodproofing and flood insurance is the likely alternative. Substantial periodic flooding to existing community developments and associate damage and community disruption would be anticipated. This alternative would not adequately address the community, and regionally expressed desires to provide sufficient flood damage reduction measures to existing floodprone community developments important in maintaining and promoting continued growth and development. Additionally, community and regional resources would continue periodically to be expended in addressing flood emergency situations and recovery, when they could be better utilized in other ways.

4.34 Plan 2 - Relocate Production Products, Inc. - Conditions similar to that described for No Action (Without Conditions) would be anticipated; however, Production Products, Inc., which accounts for a substantial portion of the project estimated average annual damages, would be relocated from the flood plain and reestablished in a new facility. This would protect a business important to a major industry in the community which, in turn, would contribute to sustain and promote community growth. Because of Production Products, Inc., close association with the community Magnovox production complex, it would likely be relocated within the community. Some production and employment would be temporarily disrupted during relocation. This alternative, however, would protect only a single entity. Other existing floodprone community developments would continue to sustain flood-associated damages and disruption detrimental to desirable community growth and development. Little environmental (EQ natural environment) concern would likely be generated with this alternative.

4.35 Plan 3 - Channelization with Fabric-Formed Concrete Erosion Protection - Flood damage reduction measures would provide 100-year event level flood protection to existing developments in the project area along the main branch and somewhat lesser protection along the west branch. Forty-six residences, four commercial/industrial, and two public developments would be protected to the 100-year event; including Production Products, Inc. Protected developments would be expected to remain and be improved in the long-term preserving existing land use and structural development resources. With the extent of existing development, no significant additional development would be expected to occur due to plan implementation. Costly disruptions to normal community activities and flood-related health and safety hazards would be reduced substantially. Some community and regional resources would likely be expended toward implementation and maintenance of the project rather than for flood emergency and recovery operations. This alternative better contributes to overall desirable community and regional growth.

4.36 Environmental (EQ natural environment) concerns must also be considered relative to community and regional growth. The significant resources important to environmental and recreational development which contribute to the general quality of life in the vicinity include the aesthetics and cold water fisheries of the area. Although some adverse effects from implementation of this plan will unavoidably impact these resources; a substantial effort has been made in plan formulation to avoid and/or minimize short and long-term adverse impacts, to make the plan at least environmentally acceptable. Reference the plan formulation and environmental consideration sections of these reports. As noted under No Action (Without Conditions), any new or redevelopment in the flood plain area would need to comply with flood insurance and flood plain management policies now in effect. This, in the long-term, should promote better utilization of flood plain areas and benefit interests in preserving or promoting more natural and/or recreational utilization of flood plain corridors.

NOTE: The following sections discuss in more detail anticipated impacts of alternative plans to parameters relative to community and regional growth and development. Reference existing and anticipated future conditions in SECTION 3 - AFFECTED ENVIRONMENT also.

Population (Displacement of People)

4.37 Plan 1 - No Action (Without Conditions) - Residents may move in and out of the floodprone area due to flooding problems. Up to 150 residents in the project area could be temporarily displaced from their homes in the event of a 100-year event flood. Up to 150 employees at Production Products, Inc., could be temporarily displaced from production employment during flood periods. Displacement could be for days, weeks, or months. Associated flood damage, safety hazards, trauma, and disruption would be anticipated.

4.38 Plan 2 - Relocate Production Products, Inc. - Conditions similar to that described for the No Action (Without Conditions) would be anticipated; however, Production Products, Inc., would be relocated and reestablished in a new facility. Some employment would be temporarily disrupted due to relocation. Continued periodic displacement of employees (150±) during stream flooding periods would be eliminated. Residents (150) in other floodprone developments would continue to suffer from periodic flood damage, safety hazards, temporarily displacement, and trauma.

4.39 Plan 3 - Channelization with Fabric-Formed Concrete Erosion Protection - Flood damage reduction measures would provide 100-year event level flood protection to existing developments in the project area along the main branch and somewhat lesser protection along the west branch. Associated reduction in temporary displacement due to flooding, flood damage, safety hazards, and trauma would be expected.

4.40 A residence adjacent to the main branch of the creek and Route 173 Bridge would need to be acquired and the residents relocated to provide room for channel improvements. The Production Products, Inc., garage would also need to be acquired to provide room for the diversion control structure and diversion channel. Another residence adjacent to the west branch and Route 173 Bridge would also be acquired and the residents relocated to provide for project area access, maintenance, and environmental protection. Acquisition and relocations would be accomplished in accordance with guidelines established by the "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970." Resident relocation within the community, if desired, should not be a problem.

Land Use and Development (Man-Made Resources)

4.41 Plan 1 - No Action (Without Conditions) - Up to 55 residences, four commercial, two industrial, and two public developments in the project area could be affected in the event of a 100-year flood. The project potential average annual damages are estimated at $417,600. Most of these developments would likely be maintained but rarely improved. Substantially flood damage reduction measures could not be implemented at the local level. Limited floodproofing and flood insurance is the likely alternative. Any new or redevelopment in the flood plain area would need to comply with flood insurance and flood plain management policies now in effect.

4.42 Plan 2 - Relocate Production Products, Inc. - Conditions similar to that described for No Action (Without Conditions) would be anticipated;

however, Production Products, Inc., which accounts for a substantial portion of the project estimated average annual damages, would be relocated from the flood plain and reestablished in a new facility. The present structures would be demolished and the site returned to a more natural condition. Because of Production Products, Inc., close association with the Magnovox complex, the business would likely be relocated within the community. An appropriate site would be required for the new facilities.

4.43 Plan 3 - Channelization with Fabric-Formed Concrete Erosion Protection - Flood damage reduction measures would provide 100-year event level flood protection to existing developments in the project area along the main branch and somewhat lesser protection along the west branch. Forty-six residences, four commercial/industrial, and two public developments would be protected to the 100-year event; including Production Products, Inc. Protected existing developments would be expected to remain and be improved in the long-term maintaining similar to existing land use in the area. With the extent of existing development, no significant additional development would be possible due to project implementation. The village 100-year flood plain would be redesignated to "with project" conditions. Any new or redevelopment in the flood plain area would need to comply with flood insurance and flood plain management policies now in effect.

4.44 Land areas primarily impacted by plan implementation would be: the creek bed (3.5A), the area behind Tyler Court (7.5A), and the area in the vicinity of the bridge (.5A). The creek channel would be modified according to plan. The area behind Tyler Court - recently wooded, but currently open - would be utilized for the diversion channel and as a graded fill area and returned to a natural open area. Riparian trees are to be maintained along the natural channel with landscaping in the natural area and along the diversion channel. Route 173 and a replacement bridge would be realigned just west of the existing bridge. A house on the southeast corner of the intersection of the main branch and Route 173 would be acquired and demolished, and the area backfilled, graded, and landscaped to accommodate channel design. Reference paragraph 4.40 for information on acquisition and relocations. Also reference the Environmental Scheme in the Environmental Appendix which follows this EIS.

Residential

4.45 Reference Population (Displacement of People) and Land Use.

Business and Industry/Employment and Income

4.46 Plan 1 - No Action (Without Conditions) - Up to 55 residences, four commercial, two industrial, and two public developments in the project area could be affected in the event of a 100-year flood. These residences provide homes for about 150 people who live and work in the area. The business and industrial developments provide employment and income to several hundred people and services to the entire community. No substantial flood protection can be incorporated at the local level. Anticipated flood damages include that to: structure, content, production, employment, and income. Significant production and employment disruption to businesses and residents

due to flooding can last for days, weeks, or even months. Disruption to Production Products, Inc., operations in turn could disrupt production and employment at the Magnovox complex.

4.47 Plan 2 - Relocate Production Products, Inc. - Generally, conditions similar to that described for No Action (Without Conditions) alternative would be anticipated; however, Production Products, Inc., which accounts for a substantial portion of the project estimated average annual damages, would be relocated from the flood plain and reestablished in a new facility. Because of the businesses close association with the Magnovox production complex, the business would likely be relocated within the community. Production Products, Inc., would be required to finance a major portion of this relocation cost. Relocation would be difficult because of all the machinery involved. Some production and employment would be disrupted at the business due to relocation; however, in the long-term, disruption due to stream flooding would be vertually eliminated. Continued periodic disruption to the other remaining floodprone developments would continue. Implementation of this plan would provide some business and employment opportunities for a small local workforce in the real estate, relocation, demolition, and landscaping fields during a period of about 1 year.

4.48 Plan 3 - Channelization with Fabric-Formed Concrete Protection - Flood damage reduction measures would provide 100-year event level flood protection to exisitng developments in the project area along the main branch and somewhat lesser protection along the west branch. Forty-six residences, four commercial/industrial, and two public developments would be protected to the 100-year event, including Production Products, Inc. The plan can be implemented without substantial disruption to ongoing business and production. Flood protection would substantially reduce potential flood damage to structures and contents, and disruptions to production, employment, and income.

4.49 Implementation of this alternative would provide business and employment opportunities for a small local workforce in the real estate, channel construction, relocation, demolition, and landscaping fields. The project could probably be constructed in one or two construction seasons. Some secondary benefits to business such as motels, restaurants, gas stations, etc. might be expected during this period.

Recreational Opportunities.

4.50 Plan 1 - No Action (Without Conditions) - Despite the extensive development in the project vicinity, the creek maintains a significant cold water fishery. This induces substantial fishing activities all along the creek. If no significant flood damage reduction measures can be implemented, potential continued periodic flooding would be expected. Some maintenance channelization and clearing and snagging measures similar to those utilized after the 1981 flood might periodically be implemented in the village of Manlius vicinity. This would temporarily, if not permanently, diminish the fishery habitat and associated recreational potential in the project vicinity. Overall, however, good fishery potential could be expected to survive. Flood plain management policies restricting extensive development or redevelopment

in the immediate creek vicinity would benefit the long-term riparian and fishery habitat and in turn associated fishing potential.

4.51 Plan 2 - Relocate Production Products, Inc. - Generally, conditions with this alternative plan would be similar to those stated for Plan 1; however, Production Products, Inc. would be relocated from the flood plain and reestablished at a new facility. The existing site would be returned to more natural conditions which would benefit the riparian and fishery habitats and could also be utilized to provide for additional fishing access.

4.52 Plan 3 - Channelization With Fabric Formed Concrete Erosion Protection - Flood damage reduction measures would provide 100-year event level flood protection to developments along the main branch and somewhat lesser protection along the west branch. Protected existing developments would be expected to remain in the long term preserving similar to existing land use. Stream access would primarily remain the same or be improved but fishing yield might be reduced.

4.53 Modification (channelization & fabric formed concrete protection) in the upper reaches of the immediate construction area would adversely affect fisheries habitat in that area for both the short and long term. Fish would not likely spawn or feed extensively in this area. They should however, with incorporated environmental design channel features, be able to travel though the area to other more habitable areas both up or downstream. Associated recreational fishing activities in alternate areas would be anticipated.

4.54 Channelization in the main stream reach between the proposed diversion control structure and the main and west branch confluence would disrupt the existing fishery habitat in the short term. With a generally deeper and narrower new channel bottom, much of the existing channel bottom area would be lost. With incorporation of environmental design measures (placement of riprap and blocks) and the effects of normal stream flow, similar to existing conditions should be reestablished for this reach in the long-term. Associated recreational fishing activities would be anticipated.

4.55 The outflow for Tributary 9 would need to be extended and protected from erosion so as to flow into the previously mentioned, more natural section of the main channel. Continued fishery access would be the prime design criteria. Additionally, no significant adverse impacts to the fishery habitat or access should result within the west branch resulting from implementation of this plan. Recreational fishing should not be significantly affected for the long term in these areas.

4.56 Proposed environmental design measures include incorporation of a low-flow channel with riffle and pooling areas in the modified main channel reaches, preservation or planting of riparian vegetation along the west and south creek embankments, and permanent access along the modified main branch and part of the west branch to provide for project maintenance access and fishing access. These measures would help to maintain fishery access and habitat through the area, and enhance fishing access to the area.

Agriculture (Prime Soils, Displacement of Farms).

4.57 Plan 1 - No Action (Without Conditions) - The immediate project area is not conducive to extensive agricultural use because of its location in a developed area. No portion of any county designated agricultural district has been identified within the immediate project vicinity although some county designated prime farmland mapping unit soils have been identified for the area indicating some agricultural potential.

4.58 Plan 2 - Relocate Production Products Inc. - Generally, conditions for this alternative would be similar to those stated for Plan 1; however, Production Products, Inc. would be relocated from the flood plain and reestablished at a new facility. The existing site would be returned to more natural or park like conditions. Although unlikely, agricultural activity could be a possible utilization for the area. Developments often result in the loss of potential agricultural land. It is possible that the site selected for the relocation of Production Products, Inc., of could be some agricultural value also.

4.59 Plan 3 - Channelization With Fabric Formed Concrete Erosion Protection - Flood damage reduction measures would provide 100-year event level flood protection to the community developments along the main branch and a somewhat lesser protection along the west branch. Protected existing developments would be expected to remain in the long term preserving similar to existing land use. No significant impact to agricultural activities or displacement of farms would be anticipated as a result of implementation of this plan. Approximately 1.5 acres of identified potential prime farmland soils would be disturbed by streambank channelization and 2.5 acres by diversion channel construction. Reference Figure 5. Excavated soils would for the most part be redistributed and graded within the project vicinity. Erosion and siltation protection measures would be implemented during and after project construction. Reference the Environmental Appendix.

Public Facilities and Services.

4.60 Plan 1 - No Action (Without Conditions) - Adequacy of public facilities and services such as water, sewage, utilities, and police and fire protection are generally determined by demand, availablility of resources, and the ability of the community to meet those demands. Basic public facilities and services in the Manlius vicinity appear to be sufficiently adequate and are anticipated to be so for the project future.

4.61 If no significant flood damage reduction measures can be implemented, potential continued periodic flooding of existing community developments would be anticipated. This in turn would require continued expenditure of community resources to maintain facilities and to service the public needs in addressing the flood emergency situations.

4.62 Plan 2 - Relocate Production Products, Inc. - Generally, conditions for this alternative plan would be similar to those described for Plan 1; however, Production Products, Inc. would be relocated from the flood plain and reestablished at facility. Emergency services to the company due to

flooding would no longer be required. With relocation, utilities and services would no longer be necessary to the existing site but would need to be reestabished at the relocation site. The existing site would be returned to a more natural condition.

4.63 Plan 3 - Channelization With Fabric Formed Concrete Erosion Protection - Flood damage reduction measures would provide 100-year event level flood protection to developments along the main branch in the project vicinity, but somewhat lesser protection for developments along the west branch. Flood damage reduction measures would significantly reduce hazards associated with flooding and make the project area a safer place in which to live. Less demand on emergency type services would be required during potential flood periods. Protected existing developments would be expected to remain in the long term and already established facilities and services could continue to be utilized. Periodic maintenance of the flood damage reduction structures, however, would probably be assumed by the community.

4.64 Although 100-year event level flood protection is a significant level of protection; floods of greater magnitude could occur. Flood damage reduction measures may present a somewhat false sense of security for residents in this situation, and they should be kept well informed of the limitation of these measures. Additionally, although existing flow velocities through the project area are swift and potential safety hazards exist; flood level flow velocities through the modified channel would be even greater. These areas should be avoided during potential flood periods.

4.64a Some minor relocation and disruption of utilities and services in the area may be necessary during project construction. Construction equipment access would occur along structurally adequate existing access roads or modified/new/temporary access roads designed for that purpose. Anticipated adverse impacts to existing roads would be negligible.

Property Values and Tax Revenues.

4.65 Plan 1 - No Action (Without Conditions) - Developed flood plain properties are comparable but of somewhat lesser value than similar developments in other areas of the community. Still, these represent significant existing property and associated tax revenue to the community. These relationships would be expected to continue for the near future. Revenues would continue to be expended in addressing the continued flooding problems.

4.66 Plan 2 - Relocate Production Products, Inc. - Generally, conditions for this alternative plan would be similar to those described for Plan 1; however, Production Products, Inc. would be relocated from the flood plain and reestablished at another location. Production Products, Inc. would be required to finance a major portion of this relocation cost. While the property value of the existing site would be decreased significantly, the property value of the newly developed site would be increased accordingly. Because of the important relationship between Production Products, Inc. and the Magnavox complex; Production Products, Inc. would probably be relocated in the near vicinity, and the community should not loose significant tax revenue.

4.67 Plan 3 - Channelization With Fabric Formed Concrete Erosion Protection - Flood damage reduction measures would provide 100-year event level flood protection to existing community developments along the main branch in the project area and a somewhat lesser degree of protection along the west branch. With 100-year event level of flood protection, properties may be improved and property values would be expected to increase slightly. Non-developed property values may increase even slightly higher because of new developmental potential, but since the protected area is already fairly well developed, further development would be limited. The need for extensive flood insurance would be substantially reduced. Associated community revenues from protected property values and commercial/industrial activities would be maintained or increased slightly, although a share of community revenue would probably contribute to the local share for project construction and maintenance.

Noise.

4.68 Plan 1 - No Action (Without Conditions) - No severe external noise problems were noted or would be anticipated in the project vicinity.

4.69 Plan 2 - Relocate Production Products, Inc. - Generally, conditions for this alternative plan would be similar to those stated for Plan 1; however, Production Products, Inc. would be relocated from the flood plain and reestablished at another facility. Construction of a new structure, relocation, and demolition of the old structure during plan implementation would create short-term minor noise impacts.

4.70 Plan 3 - Channelization With Fabric Formed Concrete Erosion Protection - Noise associated with the operation of heavy equipment in clearing, excavation, trucking, and construction would be noticeable in the construction and trucking areas of the project vicinity. These noises would occur during normal daylight hours. Although probably noticeable to persons in some residences and businesses in the immediate construction area; no significant noise related problems are expected. No noise sensitive institutions were noted in the construction area. Noise impacts will be localized and temporary and could be minimized by modifying noise producing project activities if the situation warrants. It is anticipated that project construction would be completed during one or two construction seasons. Noise levels should return to normal after construction is completed although some periodic operation of equipment for project maintenance may be required. Noise generated by these operations would be of lesser magnitude than that generated during the initial construction period.

Aesthetics.

4.71 Plan 1 - No Action (Without Conditions) - The aesthetics of the area is that associated with the residential and light commerical/industrial developments in the vicinity, most of which are well maintained. The creek apparently has been cleared and snagged and channelized to some extent since the last flood (81). Although restoration measures are noticeable, the view along the creek of the tree-lined bank (narrow band) and riffled stream flow; is aesthetically pleasing. This restored aesthetic condition, however, could

be disturbed periodically to post-flood conditions should significant flooding recur. Restoration measures again would need to be implemented altering existing aesthetics.

4.72 Plan 2 - Relocate Production Products, Inc. - Generally, conditions for this alternative plan would be similar to those stated for Plan 1; however, Production Products, Inc. would be relocated from the flood plain and reestablished at a new facility. Both the new and existing construction sites would be disrupted temporarily during the construction, relocation, and demolition process. The existing site would be returned to more natural or park like conditions which would probably benefit the riparian aesthetics in the area.

4.73 Plan 3 - Channelization With Fabric Formed Concrete Erosion Protection - The existing channel (main branch) in the upper reaches of the project area would be modified and lined with fabric formed concrete and riprap erosion protection material. Some riparian vegetation would also need to be removed. This would adversely alter the natural appearance of the stream channel in this vicinity replacing the natural channel with a man-made channel.

4.74 In the lower reach of the project area, a new channel for high flows would be excavated on an alignment between the Tyler Court residential development and the existing creek bed. This channel would also be lined with fabric-formed concrete. Excavation, filling, and grading along this channel alignment would require the removal of much of the existing natural vegetation and alter the topography in the vicinity disrupting the natural setting of the area. The confluence area of the main, west, and new diversion channels would also need to be lined with fabric formed concrete or riprap erosion protection.

4.75 In the existing channel (main branch) in the lower reach of the project vicinity (between the channel diversion and the confluence), most of the channel bottom would be deepened and consequently narrowed to maintain low flows through the area. Much of this reach would be riprapped to stabilize the channel and to provide fishery habitat. This reach, however, would then be left to return to more natural conditions. Existing riparian vegetation, particularly along the west embankment, would be preserved where possible.

4.76 Post-project aesthetics will be improved by landscaping and planting techniques.

Community Cohesion.

4.77 Plan 1 - No Action (Without Conditions) - Although some minor remedial measures may be implemented by the community, if no substantial flood damage reduction measures can be implemented, the existing community developments will continue to sustain periodic flood damages and disruptions associatd with flooding. These disruptions to existing community developments and normal community activities is in turn disruptive to normal community cohesion.

4.78 Residents and tenants of the existing developments in the flood prone area have suffered from periodic flooding for quite some time and desire some form of action from their community and elected officials in addressing their

problems. A determination of No Action would further frustrate flood damage victims and government officials seeking a solution to the flooding problems. On the other hand, costs, responsibilities, and environmental concerns must be considered.

4.79 Plan 2 - Relocate Production Products, Inc. - Generally, conditions for this alternative plan would be similar to those stated for Plan 1; however, Production Products Inc. which accounts for a substantial portion of the estimated potential flood damages, would be relocated from the flood plain and reestablished at another location. With this action, the business and production process of an important component to the community Magnavox complex operations would be relieved from potential periodic damage and disruption associated with flooding. Protection of this important community industry and better assurance of continued operations may benefit the entire community and in turn contribute to community cohesion.

4.80 On the other hand, and probably of greater significance, protection of a single entity (although fairly significant) while a majority of others with similar problems continue to suffer; would heighten conflict among various interest groups. The conflict of benefits through government action and funding to a single entity versus benefits to a multitude in the community, would be of major issue.

4.81 Plan 3 - Channelization With Fabric Formed Concrete Erosion Protection - Flood damage reduction measures would provide 100-year event level flood protection to community developments along the main branch in the project area and somewhat lesser protection for developments along the west branch. Protected existing developments would be expected to remain in the long term. This alternative would alleviate flooding problems for a majority of the community developments including Production Products, Inc. This multiple protection feature would better promote community cohesion.

4.82 Environmental and fishing interests are concerned about potential adverse impacts of construction and proposed channelization measures to sport fisheries of the area. Although a multitude of environmental design measures have been incorporated into the channel design, some adverse impacts will occur, and concerns persist.

4.83 A share of the initial project construction cost and maintenance costs will be allocated to the local sponsor and in turn to the local community. This is subject to further community review and evaluation.

CULTURAL RESOURCES - ALTERNATIVE PLAN EFFECTS

4.84 The finalized initial cultural resource reconnaissance study report was provided to the cultural resource agencies in June 1982. Reference paragraph 3.74. Proposed project finalized plans were coordinated with the New York State Historic Preservation Office (NYSHPO) and the National Park Service in August of 1983. The SHPO, responding in a 22 September 1983 letter, stated that based on the information provided, ". . . it is the opinion of the SHPO that this project will have no effect upon cultural resources included in or eligible for inclusion in the National Register of Historic Places" (NRHP).

4.85 Of the potential historic sites identified in the initial cultural resources reconnaissance study, several, including: the 1920 Route 173 Bridge, a 19th Century residence, and parts of several old mill raceways would be disrupted with proposed project implementation. Further information on these items was coordinated with the SHPO via 3 September 1985 letter for their opinion on NRHP eligibility and significance of project impacts to cultural resources. Their response letter dated 17 October 1985 stated that in their opinion, the structures identified do not meet the National Register criteria. They also recommended further archaeological investigation within the proposed impact area of the bridge replacement. This will be coordinated with the New York State Department of Transportation (NYSDOT) who will be responsible for the bridge replacement portion of the project.

4.86 Findings of the supplemental cultural resources reconnaissance study (diversion channel area) will be coordinated with the various cultural resources agencies. Information on any potential significant cultural resource items identified in the study that would be affected by implementation of the study will be coordinated with the SHPO relative to NRHP eligibility. Plans for mitigation of any NRHP eligible properties or items identified to be of local significance will be formulated, as necessary.

4.87 Documentation to demonstrate compliance with cultural resources legislation will be coordinated as a supplement prior to award of any construction contract.

4.88 Plan implementation: will destroy small portions of several old mill raceways, will require the acquisition and probable demolition of a residence built in the 19th Century, and will require the replacement and demolition of the Route 173 concrete arch bridge built in 1920. Reference paragraph 3.75. Pending additional cultural resource study findings: cultural resource study documentation will provide necessary historic cultural resource data. No necessary additional mitigation measure is anticipated at this time.

SECTION 5
LIST OF PREPARERS

5.01 The following people are primarily responsible for preparing this Environmental Impact Statement:

Section and Name	Expertise	Experience	Professional Discipline
Small Projects & Special Studies			
William Werick (Project Manager)	Math, Engineering, Planning	6 years Small Projects Project Manager, 14 years Operations and Maintenance: U.S. Army Engineer District, Buffalo.	Civil Engineer
Environmental Branch			
Tod Smith (EIS Coordinator)	Environmental Planning	7 years EIS studies and Engineering Technician/ Draftsman; U.S. Army Engineer District, Buffalo.	Community Planner
Leonard Bryniarski	Natural Resources (Aquatic and Terrestrial Biology)	11 years, EIS studies; U.S. Army Engineer District, Buffalo. 12 years U.S. Soil Conservation Service.	Ecologist
Philip Frapwell	Aquatic Biology	7 years, EIS studies; U.S. Army Engineer District, Buffalo.	Biologist
Timothy Daly	Cultural Resources	7 years, EIS studies; U.S. Army Engineer District, Buffalo.	Social Scientist
Economic Branch			
Sharon Cooper	Economics	6 years, Economic Analysis U.S. Army Engineer District, Buffalo.	Economist

SECTION 6
PUBLIC INVOLVEMENT

INTRODUCTION

6.01 This section briefly describes the study's Public Involvement Program, Required Coordination, Statement Recipients, and Public Views and Responses.

PUBLIC INVOLVEMENT PROGRAM

6.02 Study activities have been coordinated with appropriate governmental agencies and the general public. The U.S. Army Corps of Engineers public involvement program incorporates a series of project public meetings and/or workshops, general and formal coordination procedures, and formal draft and final report review procedures. Public participation and correspondence is encouraged throughout the study. Pertinent correspondence is included in the Correspondence Appendix.

6.03 In October 1975, in response to a letter from Representative James Hanley, the Corps scheduled a Reconnaissance Study for the village of Manlius to start in June 1976. In December 1975, the Buffalo District notified Mayor Morgan of the upcoming Reconnaissance Study. However, because of higher priorities from a substantial workload, the Reconnaissance Study was delayed. In March 1977, Corps representatives visited the village of Manlius, and in April 1977, a Reconnaissance Study commenced. The study briefly investigated historic and existing flooding problems along Limestone Creek and the feasibility of potential alternative solutions. The conclusion of the study indicated that a Federal interest exists for providing flood protection along various sections of Limestone Creek and that potential justifiable solutions exist that could be implemented under authority of Section 205. The Reconnaissance Report was completed in July of 1977 and approved in August of 1977.

6.04 Subsequently, the detailed planning investigation and preparation of the Detailed Project Report was initiated in October of 1982. For this investigation, in addition to the the formal Federal, State, and local coordination, a number of public and agency workshops and meetings were conducted. Pertinent formal workshops and meetings for this investigation are listed as follows.

Table EIS-3 - Public Workshops/Meetings

Date	Primary Purpose	Location
8 Nov 79	Public workshop primarily to initiate public involvement, summarize study authority, identify water resources problems and needs, and to formulate some planning objectives.	Village of Manlius

Table EIS-3 - Public Workshops/Meetings (Cont'd)

Date	Primary Purpose	Location
12 Feb 82	Meeting (made public) with town, village (both Manlius and Fayetteville), and State officials to discuss aspects of alternative study authorities and feasibility and effectiveness of various alternative measures. Decision to initiate two Section 205 studies.	Village of Fayetteville
22 April 82	Stage II - Public Meeting/Hearing to review the study process and progress, to present a preliminary assessment of the most feasible alternative measures, and to summarize Stage II findings and recommendations.	Village of Manlius
1 Dec 82	Workshop with environmental groups to determine if the Corps proposed flood control design could be modified so as to be acceptable to New York State Department of Environmental Conservation; U.S. Fish and Wildlife Service; private concerned environmental groups, and the village of Manlius; while still meeting requirements for Federal recommendation.	New York State Department of Environmental Conservation, Cortland, NY
25 Feb 83	Workshop with New York State Department of Environmental Conservation, U.S. Fish and Wildlife Service, and village of Manlius representatives to discuss details of revised proposed flood control design.	Village of Manlius
4 Aug 83	Workshop with New York State Department of Environmental Conservation, U.S. Fish and Wildlife Service representatives to discuss final details of revised flood control design.	New York State Department of Environmental Conservation, Liverpool, NY
Nov 83 - May 85	**COE Division review, District revisions, Division review, District revisions.**	**Chicago/Buffalo**
May 85	**Draft DPR, EIS, and Appendices to the public.**	**Federal, State, local**

6.05 Additionally, a number of field trips and informal discussions with town and village citizens contributed to the public involvement program and planning process.

REQUIRED COORDINATION

6.06 Due primarily to: a substantial expenditure of Federal funds; the identified significance of the fishery resources of Limestone Creek and potential impacts to that resource; and potential substantial benefits to the community of flood damage reduction and social well being; a determination of the need to prepare an Environmental Impact Statement (EIS) was made. A Notice of Intent to prepare an EIS was published in the Federal Register 30 March 1982.

6.07 Throughout the study and planning process, close coordination has been maintained with the town of Manlius, the village of Manlius, and the New York State Department of Environmental Conservation (NYSDEC). In New York State, for Corps investigations conducted under the Section 205 study authority, NYSDEC is designated as the local cooperator. NYSDEC generally coordinates with the Corps and the locals to attain necessary local assurances. Local and State representatives were present at all of the pertinent coordination meetings and workshops. They contributed signficiantly to the plan formulation and cooperation process both from the flood protection and fish and wildlife preservation aspects.

6.08 Close coordination has also been maintained with the U.S. Department of the Interior - Fish and Wildlife Service (F&WS). This included a number of joint agency field investigations, coordination meetings, corespondence, telephone discussions, and a formal plan review process. A field trip was conducted to the Limestone Creek watershed vicinity by both Corps and F&WS representatives in November of 1979. A 29 February 1980 planning aid letter was submitted to the Corps, Buffalo District by F&WS which generally described the fish and wildlife resources of the watershed. In June of 1981, potential alternative plans for the Manlius vicinity were sent to F&WS for their review to which they provided a second 23 July 1981 planning aid letter. It assessed the potential impacts of proposed alternatives to fish and wildlife resources and provided alternative recommendations. With the evident significance of fishery resources in the watershed, a joint agency (COE and F&WS) detailed field study of both the Manlius and Fayetteville vicinities was conducted. This study report was provided to the Corps by F&WS in January of 1983 and substantiated significant fisheries in the creek. The most feasible alternative plans were provided to F&WS in February of 1983 and detailed revisions in August of 1983. The F&WS Draft Coordination Act Report, providing final recommendations and assessment of potential impacts of the proposed feasible plans to fish and wildlife resources, was received in April of 1983. The Final Coordination Act Report was received in October of 1983. This was also coordinated for concurrence with NYSDEC. A copy of this report is included in the attached Environmental (EIS) Appendix. Recommendations have been incorporated to the extent possible.

6.09 A Public Notice and Section 404(b)(1) Evaluation Report was coordinated with Federal, State, and local agencies, and the public with the Draft DPR and EIS. No significant comments specific to the Section 404(b)(1) Evaluation Report were received. A copy of the Public Notice and Section 404(b)(1) Evaluation Report is included in the Environmental (EIS) Appendix.

6.10 In order to comply with cultural resources legislation, coordination was initiated with the various cultural resources agencies. An initial cultural resources reconnaissance study was completed and provided to these agencies in June 1985. Finalized project plans were coordinated with the State Historic Preservation Office (SHPO) and the National Park Service in August 1983. The SHPO, in a letter dated 22 September 1985, stated that based on the information provided: " . . . it is the opinion of the SHPO that this project will have no effect upon cultural resources included in or eligible for inclusion in the National Register of Historic Places." (NRHP)

6.10a Information specific to potentially significant cultural resource items identified in the cultural resources reconnaissance report that would be affected by implementation of the proposed project was coordinated with the SHPO by letter dated 3 September 1985. Their opinion relative to NRHP eligibility and significance of impacts to cultural resources was requested. They indicated in a letter dated 17 October 1985 that in their opinion the items do not meet NRHP criteria.

6.10b A supplemental cultural resources reconnaissance study is to be completed along the proposed diversion channel alignment. This area was not specifically investigated in the initial study. Findings are to be coordinated with the various cultural resources agencies. Plans for mitigation of any NRHP eligible properties or items identified to be of local significance are to be formulated, as necessary. Documentation to demonstrate compliance with cultural resources legislation will be coordinated as a supplement prior to any construction contract.

6.10c Reference EIS pages 24 and 43, and the Cultural Resources Compliance subappendix of the Environmental Appendix for additional detail. The Environmental Appendix follows the EIS text.

6.11 In addition to the previously mentioned required coordination, Corps investigations must comply with a multitude of other pertinent Federal and State environmental legislation and Executive Orders. This is generally accomplished via the Corps planning process; special investigation, review, and coordination; and coordination of the draft and final Detailed Project Report and Environmental Impact Statement. The present relationship of plans to environmental protection statutes and other environmental requirements is briefly summarized in EIS Table 1.

STATEMENT RECIPIENTS

6.12 The following agencies, interest groups, and individuals received copies of the Draft Detailed Project (DPR), Draft Environmental Impact Statement (EIS), and associated appendices (or a Notice of Availability) for information, review, and/or comment.

Congressional

U.S. Senator - Alphonse D'Amato
U.S. Senator - Daniel P. Moynihan
U.S. Representative - George Wortley

Federal

Advisory Council on Historic Preservation
Department of Agriculture
Forest Service
Soil Conservation Service
Department of Commerce
Department of Defense
Department of Energy
Environmental Protection Agency
Federal Emergency Management Administration
Department of Health and Human Services
Department of Housing and Urban Development
Department of the Interior
Department of Transportation

State

Office of the Governor
New York State Clearinghouse
New York State Department of Agriculture and Markets
New York State Department of Commerce
New York State Department of Environmental Conservation
New York State Department of Health
New York State Department of Transportation
New York State Office of Parks, Recreation, and Historic Preservation
New York State Office of Planning Services
Office of the State Archeologist

Regional and Local

Central New York Regional Planning and Development Board (A-95)
Onondaga County (Agencies)
Town of Manlius
Village of Manlius
Village of Fayetteville
Trout Unlimited
Other Regional Environmental Groups

Other Organizations and Individuals.

Individuals are not listed. A complete mailing list is on file at the U.S. Army Corps of Engineers, Buffalo District Office.

PUBLIC VIEWS AND RESPONSES
(Reference the Environmental and Correspondence Appendices also.)

6.13 The New York State Department of Environmental Conservation (NYSDEC), as the local sponsor, generally supports the proposed project provided incorporation of environmental design measures, and acceptance of pending cost allocation determinations. Reference paragraph 6.15 also.

6.14 The town and village of Manlius generally support the project provided sufficient consideration of various interest groups, and acceptance of pending cost allocation determinations.

6.15 The U.S. Fish and Wildlife Service and the New York State Department of Environmental Conservation (Fish and Wildlife Resources Section) will consent to the project provided incorporation of recommended environmental design measures. Reference the U.S. Fish and Wildlife Coordination Act Report recommendations and NYSDEC's letter of concurrence in the Environmental (EIS) Appendix. Recommendations are incorporated into the proposed plan to the extent possible. Reference d. Environmental Considerations in the section entitled DESCRIPTION OF THE SELECTED PLAN in the main text of the Detailed Project Report (DPR). Reference the Environmental Scheme in the Environmental (EIS) Appendix also.

6.16 The U. S. Environmental Protection Agency (USEPA) concerns and recommendations closely parallel those of the (USF&WS) and (NYSDEC). Recommendations are incorporated into the proposed plan to the extent possible. Reference the Comment/Response subappendix and the Environmental Scheme in the Environmental (EIS) Appendix also.

6.17 Project information and cultural resource items have been coordinated with the various cultural resource agencies. Project comments were obtained from the State Historic Preservation Office (SHPO). To date, the SHPO has stated that: . . . it is the opinion of the SHPO that this project will have no effect upon cultural resources included in or eligible for inclusion in the National Register of Historic Places (NRHP). Supplemental cultural resources studies are to be completed and coordinated. Reference EIS pages 24 and 43, paragraph 6.10, and the Cultural Resources subappendix of the Environmental Appendix for additional detail.

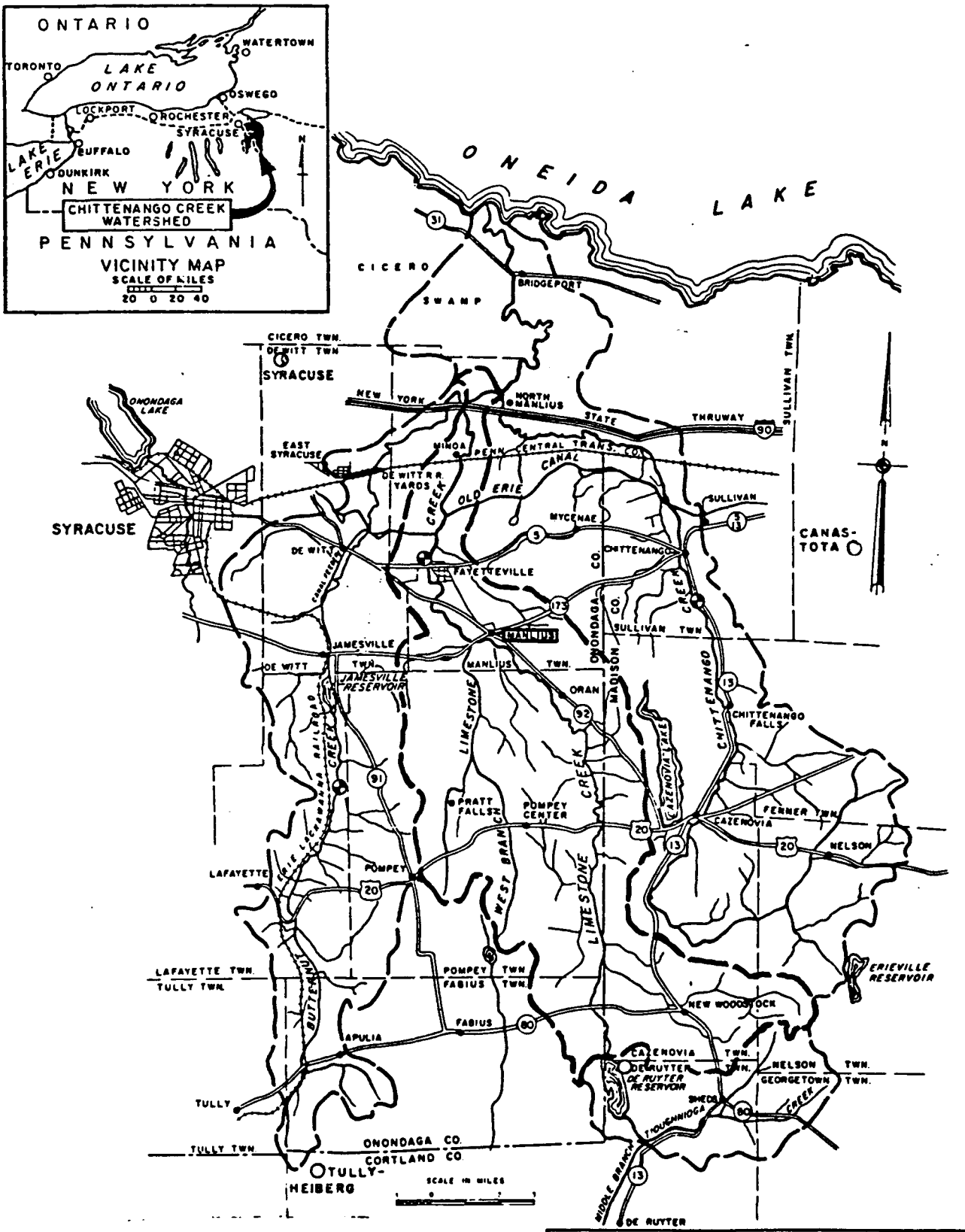
6.18 Comments received on the Draft Detailed Project Report (DDPR) and Draft Environmental Impact Statement (DEIS) and appendices, and the Corps of Engineers, Buffalo District responses are included in the Comment/Response subappendix of the Environmental Appendix.

LIMESTONE CREEK - SECTION 205

AT MANLIUS, NEW YORK

ENVIRONMENTAL IMPACT STATEMENT
REFERENCE TABLES AND FIGURES

U.S. Army Corps of Engineers
Buffalo District



LEGEND:

OFFICIAL RAINFALL STATIONS
- ● RECORDING
- ○ NON-RECORDING
- ◑ BOTH

⊕ U.S.G.S. WATER-STAGE RECORDING GAGE.

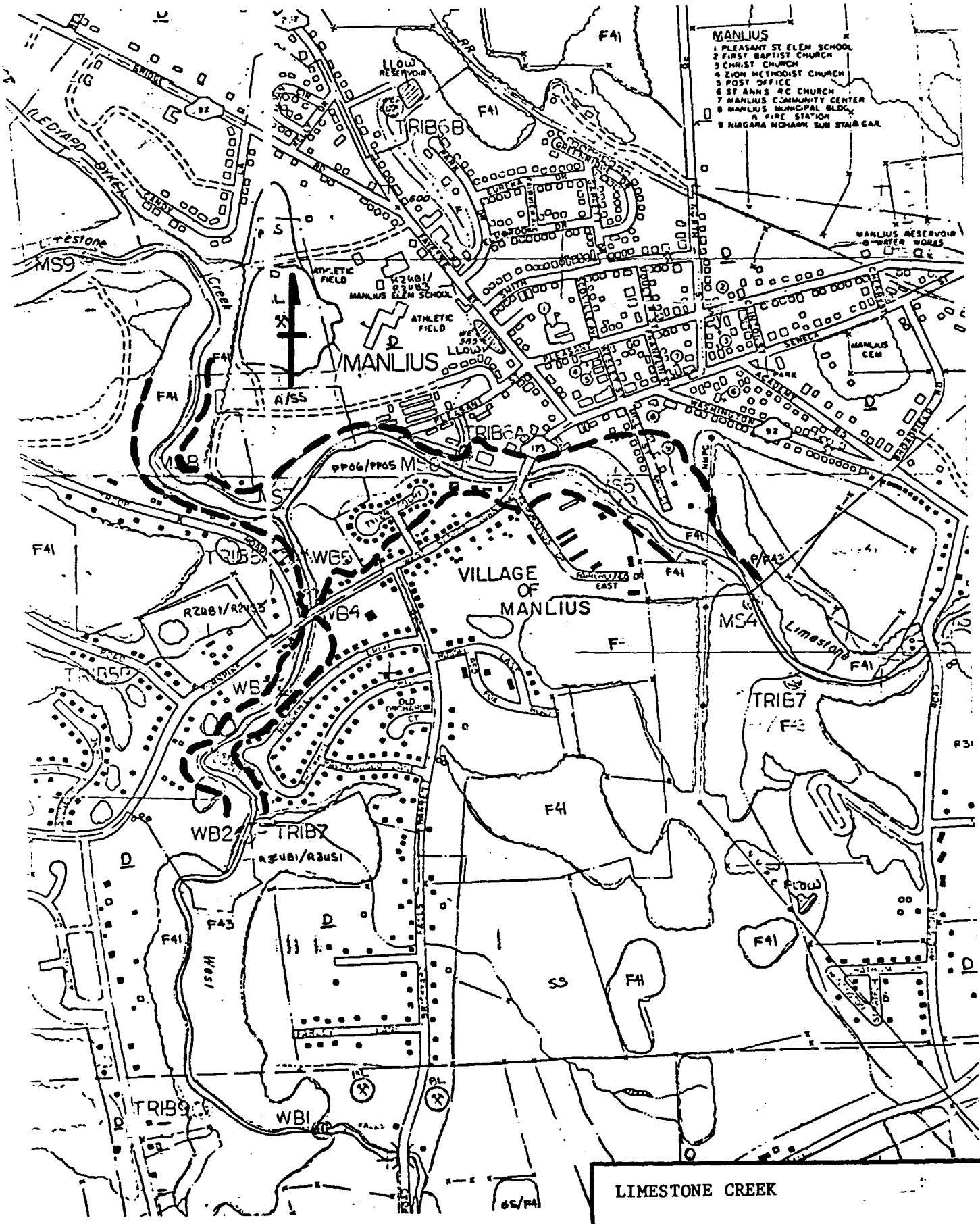
SUB BASIN DIVIDE

LIMESTONE CREEK
MANLIUS TOWNSHIP, NEW YORK

BASIN MAP

U. S. ARMY ENGINEER DISTRICT, BUFFALO

REFERENCE FIGURE 1



LIMESTONE CREEK

100 YEAR EVENT

VILLAGE OF MANLIUS VICINITY

REFERENCE FIGURE 2

REFERENCE TABLE 1
FLOOD DAMAGE REDUCTION MEASURES.

Nonstructural Types - Modify damage susceptibility.

1. Installation of temporary or permanent closures for openings in structures.

2. Raising existing structures in-place.

3. Constructing new structures on fill or columns.

4. Constructing small walls or levees around structures.

5. Relocating or protecting damageable property within an existing structure.

6. Relocating existing structures and/or contents out of a flood hazard area.

7. Use of water resistant materials in new or existing structures.

8. Regulation of development of flood plain land by zoning ordinances, subdivision regulations, and building codes.

9. Acquisition of title or easement to flood plain land.

10. Flood Insurance.

11. Installation of flood forecast and warning systems with an appropriate evacuation plan.

12. Adoption of tax incentive to encourage wise use of flood plain land.

13. Placement of warning signs in the flood plain to discourage development.

14. Adoption of development policies for facilities in or near flood plain land.

Structural Types - Modify floods or reduce the frequency of damaging outflows.

1. Dams and Reservoirs - store flood waters to be released later.

2. Levees, dikes, and walls - confine flood waters.

3. Diversions - pass flood waters around area.

4. Channel improvements, bridge modifications - improve channel to pass flood waters.

REFERENCE TABLE 2

FISH CAPTURE INFORMATION - COMBINED SPRING, SUMMER AND FALL RESULTS 1982 FOR THE LIMESTONE CREEK FLOOD CONTROL PROJECT AT MANLIUS, NY (USFWS - 1983)

SPECIES	Sta. at Up-Stream End		Sta. at Center		Sta. at Downstr. End		Sta. in Nine Trib.		Total # Fish
	#	Ave. Len.	#	Ave. Len.	#	Ave. Len.	#	Ave. Len.	
Rainbow trout Salmo gairdneri	1	21.3							1
Brown trout Salmo trutta	8	14.5	10	15.4	2	14.1	38	9.1	58
Chain pickerel Esox niger					1	8.5			1
Cutlips minnow Exoglossum maxillingua	4	8.5	9	8.9	3	9.2			16
Cyprinid Notropis sp.					3	4.4			3
Bluntnose minnow Pimephales notatus	2	7.6			6	6.3			8
Blacknose dace Rhinichthys atratulus	18	6.3	26	6.6	16	5.4	4	7.9	64
Longnose dace Rhinichthys cateractae	8	8.8	2	6.9			1	8.7	11
Creek chub Semotilus atromaculatus					1	8.0			1
Fallfish Semotilus corporalis	1	10.6	6	8.4					7
Pearl dace Semotilus margarita	10	5.6	3	6.1	5	5.3			18
White sucker Catostomus commersoni	46	22.5	8	21.4	11	9.9			65
Northern hog sucker Hypentelium nigricans			1	15.2	1	22.3			2
Stonecat Noturus flavus	1	5.5							1
Banded killifish Fundulus diaphanus					1	6.4	1	6.5	2
Rock bass Ambloplites rupestris					1	12.4			1
Pumpkinseed Lepomis gibbosus			8	8.1	3	8.7			11
Fantail darter Etheostoma flabellare	7	6.2	3	5.6					10
Johnny darter Etheostoma nigrum			6	7.0	1	5.6			7
Mottled sculpin Cottus bairdi	20	6.6	9	5.6	2	5.1	17	7.4	48
Slimy sculpin Cottus cognatus					2	6.1	2	6.7	4
TOTALS	126		91		59		63		339

NOTE: Ave. Len. = Average Length is in centimeters.

REFERENCE TABLE 3

RATIO OF TROUT TO NON-TROUT FISH SPECIES FOR VARIOUS REACHES OF LIMESTONE CREEK BETWEEN THE FEEDER CANAL DAM AND EDWARDS AND BRICKYARD FALLS AFFECTED BY THE LIMESTONE CREEK FLOOD CONTROL PROJECT AT MANLIUS, NEW YORK AS EXTRACTED FROM THE 1983 USFWS REPORT.

STREAM REACH	RATIO
Overall within the project area	1 : 5
Main Branch portion of the project area	1 : 25
Main Branch Tributary Nine portion of the project area	2 : 1
Overall Feeder Dam to both Edwards and Brickyard Falls	1 : 8
West Branch to Brickyard Falls	1 : 12
Main and West Branch tributaries	1 : 3
Main Branch Tributary Nine	1 : 1
West Branch Tributary One	1 : 1
Overall Feeder Dam to only Edwards Falls	1 : 9

REFERENCE TABLE 4

INVERTESRATES FROM THE LIMESTONE CREEK FLOOD CONTROL PROJECT AT MANLIUS, NEW YORK AREA (USFWS - 1983) SUMMER 1982

Species	Station at Upstream end of Project	Station at Center of Project	Station at Downstream End of Proj.	Station in Tributary Nine	Total #
Aquatic earthworm Unidentified sp.				9	9
Leech Unidentified sp.				2	2
Scud Gammarus	1	22	1	156	180
Mayfly Baetis	25	1			26
Mayfly Heptagenia	54				54
Caddisfly Hydropsyche	12		7		19
Caddisfly Unidentified sp.	1	2			3
Whirligig beetle Gyrinus sp.	1	1		2	4
Elmid Stenelmis		1			1
Cranefly Antocha	1				1
Cranefly Rhaphidolabius	1				1
Blackfly (larvae) Simulium sp.	7	6	3	3	19
Midge (larvae) Unidentified sp.	54	16	19	55	144
Midge (pupae) Unidentified sp.	1		1		2
Snail Physa				1	1
Snail Unidentified sp.				2	2
TOTALS	158	49	31	230	468

REFERENCE TABLE 5 - Population, 1980

	Onondaga County		Town of Manlius		Village of Manlius		Village of Fayetteville	
	Population	Percent Total	Population	Percent Total	Population	Percent Total	Population	Percent Total
Total	463,920	(100)	28,489	(100)	5,241	(100)	4,709	(100)
Setting								
Urban	379,284	(82)	22,536	(79)	5,241	(100)	4,709	(100)
Rural	81,847	(18)	5,953	(21)	0	0	0	
Sex								
Male	221,938	(48)	13,713	(48)	2,468	(47)	2,230	(47)
Female	241,982	(52)	14,776	(52)	2,773	(53)	2,479	(53)
Age								
0-4	30,973	(7)	1,757	(6)	326	(6)	274	(6)
5-17	97,136	(21)	6,780	(24)	1,255	(24)	1,004	(21)
18-64	284,963	(61)	17,260	(61)	3,099	(59)	2,942	(63)
65 +	50,848	(11)	2,692	(9)	561	(11)	489	(10)
Median Age Total	29.7	-	32.1	-	31.5	-	33.4	-
Male	28.5	-	30.9	-	29.5	-	32.6	-
Female	31.0	-	33.1	-	33.0	-	34.2	-
Race								
White	424,786	(92)	28,051	(98)	5,106	(97)	4,658	(99)
Black	30,117	(7)	76	(<1)	12	(1)	18	(<1)
American Indian, Eskimo, Aleut	3,274	(<1)	73	(<1)	11	(1)	4	(<1)
Asian & Pacific Islander	2,814	(<1)	223	(<1)	89	(2)	16	(<1)
Other	2,929	(<1)	66	(<1)	23	(1)	13	(<1)
Families	116,457	-	7,756	-	1,370	-	1,312	-
Households	165,677	-	9,633	-	1,917	-	1,778	-
Households with Persons 65 Years and Over	36,634	-	1,841	-	423	-	373	-

SOURCE: Census of Population and Housing, 1980; U. S. Census Bureau.

REFERENCE TABLE 6 - Projected Population, County and Local

Vicinity	1970 (1)		1980 (1)	Percent:	1980 (2)	Percent:	1990 (1)	Percent:	2000 (1)	Percent
Onondaga County	472,800		477,400	(1)	463,920	(-2)	504,800	(6)	544,300	(8)
Town of Manlius	26,100		29,400	(13)	28,489	(9)	31,100	(6)	33,700	(8)
Village of Manlius	4,300		6,100	(42)	5,241	(22)	6,400	(5)	6,900	(8)
Village of Fayetteville	5,000		5,600	(12)	4,709	(-6)	6,000	(7)	6,500	(8)

SOURCE: (1) New York State Water Quality Management Plan Population Projections, 15 January 1981. New York State Department of Environmental Conservation.
(2) Census of Population and Housing, 1980. U. S. Census Bureau.

REFERENCE TABLE 7 —Population, Personal Income, and Labor and Proprietors' Income, 1969 and 1978, and Projected, 1985-2030

	Historical		No-change-in-share				Low-change-in-share				Moderate-change-in-share			
	1969[1]	1978[2]	1985	1990	2000	2030	1985	1990	2000	2030	1985	1990	2000	2030
Population (July 1)	631,763	649,632	631,762	623,982	601,960	583,342	660,105	659,878	642,381	624,689	669,346	676,592	669,200	660,568
	Thousands of 1972 dollars													
Total personal income (place of residence)	2,561,197	3,114,123	3,667,022	4,073,989	4,795,926	7,860,925	3,830,041	4,306,468	5,116,231	8,417,454	3,883,189	4,414,589	5,328,245	8,898,819
By place of work														
Total labor and proprietors' income[3]	2,131,334	2,459,458	2,930,379	3,259,090	3,831,507	6,285 577	3,085,399	3,481,021	4,137,373	6,817,002	3,136,739	3,586,699	4,346,507	7,294,700
Agricultural production	31,117	20,958	22,976	24,005	26,569	39,792	22,821	23,796	26,300	39,369	22,768	23,694	26,107	38,969
Nonfarm	2,100,217	2,438,500	2,907,403	3,235,086	3,804,938	6,245,785	3,062,578	3,457,225	4,111,074	6,777,633	3,113,971	3,563,005	4,320,400	7,255,731
Private	1,786,148	2,054,996	2,474,863	2,763,376	3,259,016	5,370,712	2,611,676	2,959,873	3,530,555	5,844,576	2,656,970	3,053,364	3,715,987	6,269,946
Agricultural services, forestry, fisheries, and other[4]	4,365	4,301	5,391	6,215	7,764	14,279	5,128	5,829	7,203	13,199	5,041	5,646	6,823	12,240
Mining	3,782	5,525	6,511	7,000	7,888	11,534	6,617	7,118	8,014	11,714	6,722	7,262	8,178	11,907
Construction	144,458	122,882	164,591	201,531	282,330	602,288	174,746	217,401	308,161	659,908	178,076	224,852	325,490	710,490
Manufacturing	683,832	767,945	881,890	950,319	1,051,666	1,547,760	907,490	984,893	1,094,724	1,611,247	915,601	1,000,282	1,121,404	1,661,332
Nondurable goods	189,776	223,800	243,787	259,525	278,298	389,462	265,254	288,909	315,111	443,427	272,500	303,316	341,306	494,248
Durable goods	494,056	544,145	638,102	690,794	773,369	1,158,299	642,236	695,984	779,614	1,167,820	643,101	696,966	780,099	1,167,084
Transportation and public utilities	161,658	197,945	240,126	271,593	321,915	531,885	252,799	289,941	347,238	575,665	257,006	298,715	364,655	615,261
Wholesale trade	157,539	207,330	242,328	262,196	291,596	434,589	266,971	296,347	335,830	503,574	275,163	312,664	366,088	565,348
Retail trade	220,689	207,578	239,519	262,233	305,760	494,145	249,295	275,846	324,154	525,203	252,460	282,114	336,163	551,591
Finance, insurance, and real estate	105,932	139,581	176,663	201,216	240,857	401,898	196,194	229,899	281,050	472,199	202,860	244,186	310,247	540,015
Services	303,893	401,909	517,845	601,071	749,240	1,332,334	552,437	652,599	824,179	1,471,868	564,040	677,642	876,938	1,601,762
Government	314,069	383,505	432,540	471,710	545,922	875,072	450,902	497,352	580,518	933,056	457,001	509,640	604,413	985,785
Federal civilian	43,396	57,518	68,026	75,656	91,709	158,900	71,942	81,216	99,543	173,094	73,227	83,832	104,809	185,575
Federal military	13,628	13,050	15,161	17,012	20,751	38,543	15,161	17,012	20,751	38,543	15,161	17,012	20,751	38,543
State and local	257,045	312,937	349,353	379,042	433,461	677,630	363,799	399,124	460,224	721,420	368,613	408,796	478,853	761,668

REFERENCE TABLE 8 —Employment by Industry by Place of Work, 1969 and 1978, and Projected, 1985-2030

[Total number of jobs]

	Historical		No-change-in-share				Low-change-in-share				Moderate-change-in-share			
	1969[1]	1978[2]	1985	1990	2000	2030	1985	1990	2000	2030	1985	1990	2000	2030
Total employment	255,068	280,675	294,340	295,330	286,497	261,085	309,008	314,230	307,919	281,683	313,832	323,143	322,380	299,925
Agricultural production	4,216	4,299	4,038	3,832	3,580	3,032	3,984	3,766	3,508	2,969	3,966	3,734	3,458	2,910
Nonfarm	250,852	276,376	290,302	291,498	282,917	258,052	305,023	310,464	304,411	278,714	309,865	319,408	318,922	297,015
Private	207,003	226,889	240,587	242,312	235,610	214,857	253,404	258,866	254,403	232,942	257,614	266,655	267,050	248,901
Agricultural services, forestry, fisheries, and other[4]	661	708	753	787	799	787	713	734	736	723	700	709	694	666
Mining	384	421	437	427	403	340	443	433	408	344	449	440	414	347
Construction	13,156	12,566	14,867	16,131	18,159	20,689	15,718	17,307	19,696	22,520	15,995	17,854	20,714	24,102
Manufacturing	67,982	60,886	60,340	58,134	52,194	41,718	62,340	60,557	54,667	43,747	62,975	61,640	56,212	45,374
Nondurable goods	20,818	19,753	18,874	18,004	15,815	12,355	20,462	19,949	17,810	13,987	20,995	20,895	19,212	15,501
Durable goods	47,164	41,133	41,466	40,130	36,379	29,363	41,878	40,608	36,858	29,760	41,980	40,745	37,000	29,872
Transportation and public utilities	14,760	15,021	15,144	14,988	14,158	12,345	15,889	15,930	15,193	13,289	16,135	16,376	15 894	14,127
Wholesale trade	15,592	19,574	20,570	20,221	18,753	15,849	22,427	22,550	21,261	18,065	23,033	23,635	22,919	19,969
Retail trade	38,587	42,594	43,975	44,060	42,85:	38,479	45,508	46,009	45,043	40,535	45,999	46,893	46,447	42,241
Finance, insurance, and real estate	12,636	16,459	18,442	18,804	18,200	16,401	20,305	21,247	20,962	19,007	20,933	22,441	22,916	21,445
Services	43,245	58,660	66,058	68,760	70,094	68,249	70,061	74,099	76,437	74,713	71,394	76,667	80,840	80,632
Government	43,849	49,487	49,715	49,186	47,307	43,196	51,619	51,598	50,008	45,772	52,251	52,753	51,872	48,114
Federal $296,681									322,402	352,873	276,515	294,369	319,187	349,093
Federal military	4,259	3,046	3,034	3,034	3,034	3,034	3,034	3,034	3,034	3,034	3,034	3,034	3,034	3,034
State and local	35,249	41,783	42,027	41,468	39,559	35,440	43,665	43,537	41,859	37,596	44,209	44,530	43,453	39,568

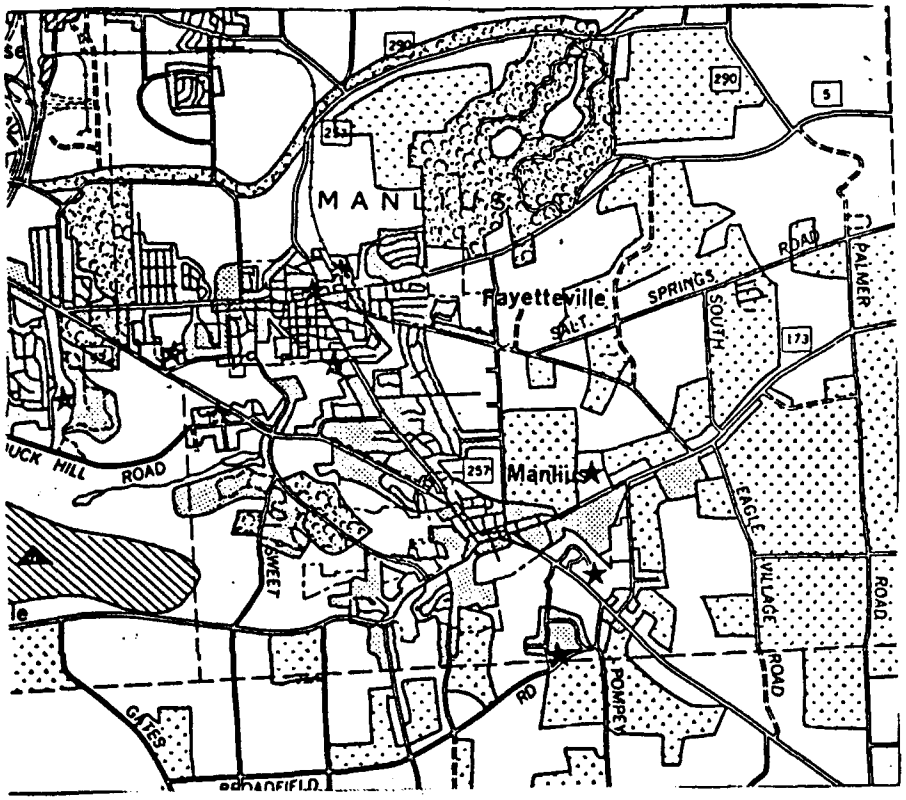
See footnotes on page 2

Source: 1980 OBERS
BEA Regional Projections
Vol. 3 Standard Metropolitan Statistical Areas
U.S. Dept. of Commerce

REFERENCE TABLE 9 - Existing and Projected Land Use in the Town of Manlius, Onondaga County, NY - 1980, 1995

Category	Onondaga County 1980	Percent of Total	Onondaga County 1995	Percent Change	Town of Manlius 1980	Percent of Total	Town of Manlius 1995	Percent Change
Residential								
High Density	2,887	.6	3,870	34.0	300	1.0	450	.5
Medium Density	32,900	6.4	41,900	27.4	2,462	7.9	3,100	25.9
Low Density	2,112	.4	2,600	23.1	50	.2	50	0
Commercial	3,286	.6	3,709	12.9	163	.5	200	22.7
Industrial	18,764	3.6	19,600	4.5	306	1.0	325	6.2
Institutional	5,080	1.0	5,170	1.8	232	.7	240	3.4
Agricultural	132,125	25.7	128,600	-2.7	3,375	10.8	3,000	-11.1
Open Space	265,507	51.6	255,791	-3.7	20,529	66.0	19,940	-2.9
Recreation	11,841	2.3	11,841	0	2,100	6.8	2,100	0
Transportation	23,974	4.7	25,395	5.9	1,288	4.1	1,400	8.7
Water	15,949	3.1	15,949	0	320	1.0	320	0
TOTAL	514,424	100	514,424	-	31,125	100	31,125	-

SOURCE: Onondaga County, 1995 Land Use Plan; Syracuse-Onondaga County Planning Agency; July 1977.

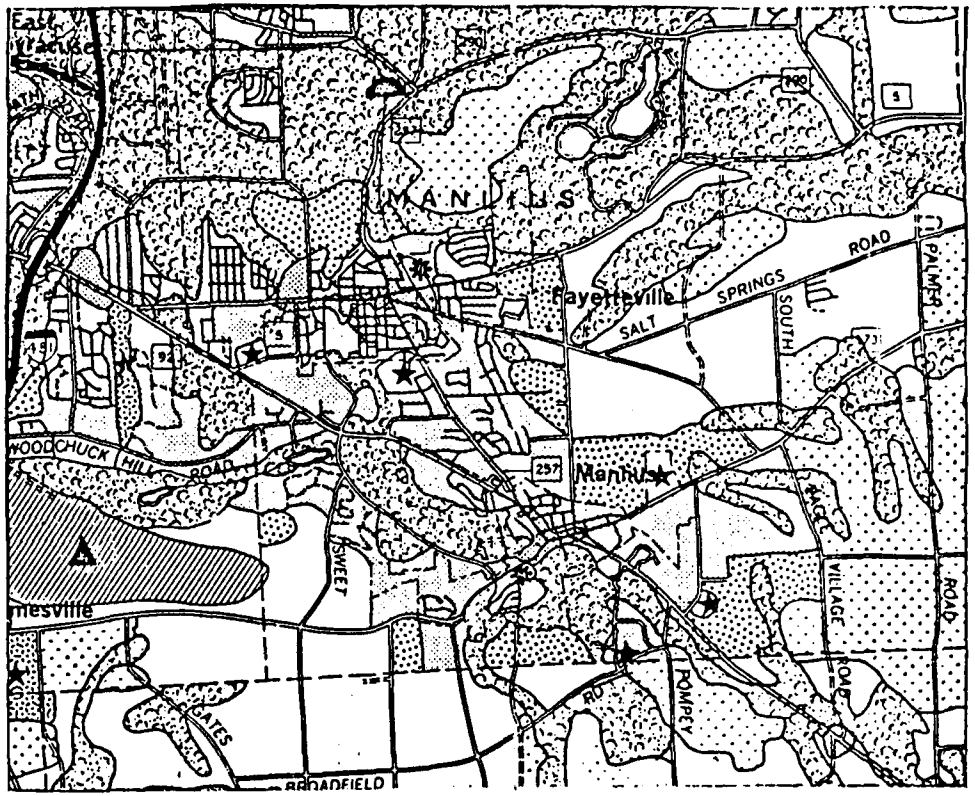


KEY TO SYMBOLS

- SCATTERED RESIDENTIAL & NON DEVELOPING
- MEDIUM INTENSITY RESIDENTIAL
- HIGH INTENSITY RESIDENTIAL
- FARM AREAS
- INSTITUTIONAL
- COMMERCIAL
- EXTRACTIVE
- INDUSTRIAL
- RECREATION

EXISTING LAND USE 1972

SOURCE: ONONDAGA CO. PLANNING



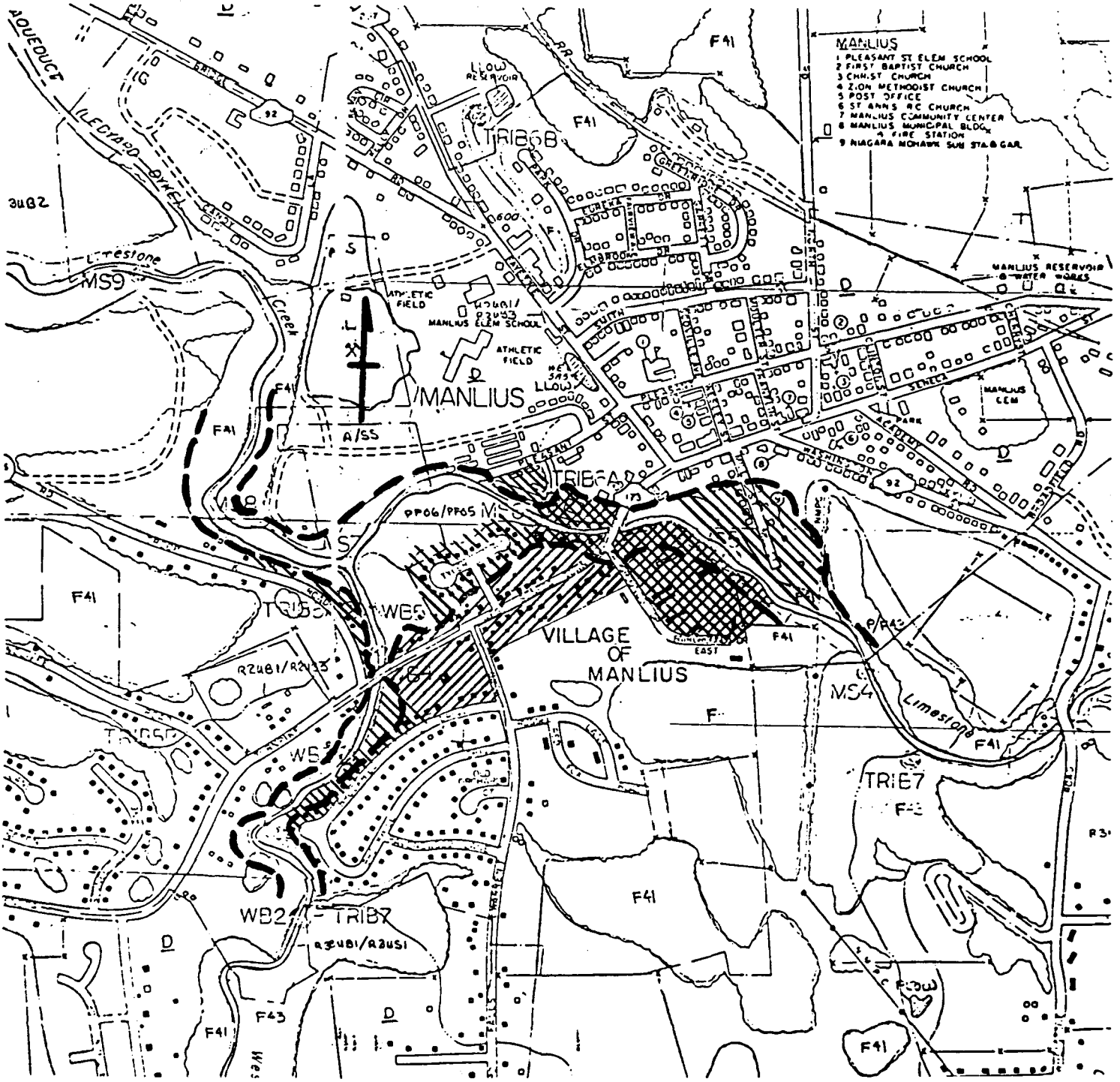
KEY TO SYMBOLS

- SCATTERED RESIDENTIAL & NON-DEVELOPING
- MEDIUM INTENSITY RESIDENTIAL
- HIGH INTENSITY RESIDENTIAL
- PROTECTED OPEN SPACE
- SEWAGE TREATMENT PLANT
- FARM AREAS
- IDLE LAND
- INSTITUTIONAL
- EXTRACTIVE
- COMMERCIAL
- INDUSTRIAL

FUTURE LAND USE 1995

SOURCE: ONONDAGA CO. PLANNING

REFERENCE FIGURE 3



OPEN

RESIDENTIAL

COMMERCIAL/RESIDENTIAL

COMMERCIAL/INDUSTRIAL

LIMESTONE CREEK . NEW YORK

LIMESTONE CREEK
MANLIUS, NEW YORK

GENERAL LAND USE

U.S. ARMY ENGINEER DISTRICT, BUFFALO

REFERENCE FIGURE 4

REFERENCE TABLE 10 - Housing, 1980

Category	Onondaga County	Total	Town of Manlius	Total	Village of Manlius	Total	Village of Fayetteville	Total
Total Housing Units (Year Round)	175,511	(100)	9,864	(100)	1,958	(100)	1,820	(100)
Occupied Housing Units (Year Round) by Tenure								
Total	165,677	(94)	9,633	(98)	1,917	(98)	1,778	(98)
Owner Occupied	102,415		7,462		1,109		1,316	
Renter Occupied	63,262		2,171		808		462	
Vacant Housing Units (Year Round) by Vacancy Status								
Total	9,834	(6)	231	(2)	41	(2)	42	(2)
For Sale	1,114		81		15		21	
For Rent	4,254		45		9		8	
Held for Occasional Use	500		11		-		-	
Other Vacants	3,966		94		17		13	
Vacant Housing Units which are Borded-Up	1,073		5		2		1	
Mean Rooms in Year-Round Housing Units by Tenure and Vacancy Status								
Total	5.6		6.4		6.2		6.2	
Owner Occupied	6.6		7.0		7.7		7.0	
Renter Occupied	4.3		4.4		4.2		4.2	
Vacant for Sale Only	6.3		6.5		6.9		5.2	
Vacant for Rent	3.9		4.4		4.4		3.0	
Other Vacant	5.1		6.3		6.3		6.4	
Persons Per Unit	2.72		2.93		2.72		2.65	
Year-Round Housing Units by Tenure and Occupancy Status by Plumbing Facilities								
Total								
Complete Plumbing	172,683	(98)	9,811	(99)	1,948	(99)	1,817	(99+
Lacking Complete Plumbing	2,826	(2)	53	(1)	10	(1)	3	(<1)
Total Occupied								
Complete Plumbing	163,438	(99)	9,587	(99+)	1,907	(99)	1,775	(99+
Lacking Complete Plumbing	2,239	(1)	46	(<1)	10	(1)	3	(<1)
Total Renter Occupied								
Complete Plumbing	61,543	(97)	2,142	(99)	801	(99)	459	(99)
Lacking Complete Plumbing	1,719	(3)	29	(1)	7	(1)	3	(1)
Specified Owner Occupied Noncondominium Housing Unit Values								
Median Value	$38,600		$48,900		$62,600		$53,300	
Specified Owner Occupied and Vacant For-Sale-Only Housing Units by Occupancy Status by Condominium Status								
Non-Condominium								
Mean Value or Price Asked								
Owner Occupied	$42,400		$55,600		$62,800		$52,600	
Vacant For-Sale-Only	$45,700		$71,100		$70,800		$46,300	
Condominium								
Mean Value or Price Asked								
Owner Occupied	$37,700		$79,600		-		$64,900	
Vacant For-Sale-Only	$38,800		$58,000		-		$50,000	
Median Contract Rent for Specified Renter Occupied Housing Units Paying Cash Rent	$ 187		$ 233		$ 227		$ 235	

SOURCE: Census of Population and Housing, 1980; U. S. Census Bureau.

REFERENCE TABLE 11 - Employment and Income, 1978

Area or County	Estimated Population 1978	Civilian Labor Force 1978	Employment 1978	Rate Percent	Personal Income (Million $) 1978	Per Capita 1978
New York State	17,748,000	7,838,000	7,236,000	(92)	146,059.4	8,230
Syracuse SMSA	775,400	295,800	276,300	(93)	4,671.2	7,191
Onondaga County	473,500	214,300	201,400	(94)	3,572.9	7,546

SOURCE: New York State Business Fact Book, 1972 and 1980 Supplements, New York State Department of Commerce.

REFERENCE TABLE 12 - Employment, 1970 and 1978 (Covered by Unemployment Insruance)

	Total			Manufacturing			Construction		
	1970	1978	Percent	1970	1978	Percent	1970	1978	Percent
New York State	5,416,937	5,684,399		1,757,041	1,486,349		266,649	199,824	
Percent of Total	(100)	(100)		(32.4)	(26.1)		(4.9)	(3.5)	
Syracuse SMSA	166,002	199,119		62,898	60,171		9,541	9,549	
Percent of Total	(100)	(100)		(37.9)	(30.2)		(5.7)	(4.8)	
Onondaga County	144,704	169,714		54,350	49,481		7,920	7,363	
Percent of Total	(100)	(100)		(37.6)	(29.2)		(5.5)	(4.3)	

	Wholesale			Retail Trade			Services		
	1970	1978	Percent	1970	1978	Percent	1970	1978	Percent
New York State	454,260	442,351		987,917	1,013,034		868,846	1,507,785	
Percent of Total	(8.4)	(7.8)		(18.2)	(17.8)		(16.0)	(26.5)	
Syracuse SMSA	14,713	17,645		33,499	38,384		19,828	44,403	
Percent of Total	(8.9)	(8.9)		(20.2)	(19.3)		(11.9)	(22.3)	
Onondaga County	14,128	16,307		27,697	32,040		17,251	38,639	
Percent of Total	(9.8)	(9.6)		(19.1)	(18.9)		(11.9)	(22.8)	

	Transportation, Communication Public Utilities			Finance, Insurance Real Estate			All Other Including Unassigned		
	1970	1978	Percent	1970	1978	Percent	1970	1978	Percent
New York State	466,548	408,460		585,022	583,403		28,655	43,192	
Percent of Total	(8.6)	(7.2)		(10.8)	(10.3)		(.5)	(.8)	
Syracuse SMSA	12,813	12,971		11,899	14,779		811	1,216	
Percent of Total	(7.7)	(6.5)		(7.2)	(7.4)		(.5)	(.6)	
Onondaga County	11,636	11,357		11,114	13,739		607	787	
Percent of Total	(8.0)	(6.7)		(7.7)	(8.1)		(.4)	(.5)	

NOTE: Syracuse SMSA - Madison, Onondaga, and Oswego Counties.

SOURCE: New York State Business Fact Book, 1972 and 1980 Supplements, New York State Department of Commerce.

INCLUDED ON LIST OF:
ONONDAGA COUNTY, NEW YORK
PRIME FARMLAND MAPPING UNITS

CfB Cazenovia silt loam, 2 to 8 % slope
Hb Hamlin silt loam
Hc Hamlin silt loam, high bottom
HyA Howard gravelly silt loam, 0 to 3 % slope
PgB Palmyra gravelly loam, 3 to 8 % slope
Te Teel silt loam

Source: Soil Survey of Onondaga County, New York
U.S. Dept. of Agriculture
Soil Conservation Service

LIMESTONE CREEK PROJECT
MANLIUS VICINITY
ONONDAGA CO., NEW YORK
SOIL SURVEY MAPS

REFERENCE FIGURE 5

LIMESTONE CREEK - SECTION 205
AT MANLIUS, NEW YORK

Environmental Appendix

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ENV. APPEN. C - SECTION 404(b)(1) PUBLIC NOTICE AND EVALUATION REPORT

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U.S. Army Corps of Engineers
Buffalo District

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LIMESTONE CREEK - SECTION 205
AT MANLIUS, NEW YORK

ENV. APPEN. B - U.S. FISH AND WILDLIFE SERVICE COORDINATION ACT REPORT

U.S. Army Corps of Engineers
Buffalo District

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
100 Grange Place
Room 202
Cortland, New York 13045

October 5, 1983

Colonel Robert R. Hardiman
District Engineer, Buffalo District
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Mr. William Werick

Dear Colonel Hardiman:

This constitutes our report on the potential effects the proposed Limestone Creek Flood Control Project at Manlius, New York would have upon fish and wildlife resources. It has been prepared under the authority of Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.)

Your investigations of flooding on Limestone Creek are being conducted under the authority of Section 205 of the 1948 Flood Control Act, as amended. The proposed project will be constructed under the same authority if granted by the Chief of Engineers or the Secretary of the Army following completion of the Final Detailed Project Report and Environmental Impact Statement.

Our report is based on project plans and other information provided by your staff through August 4, 1983; biological information provided by the New York State Department of Environmental Conservation (NYSDEC); biological and other information provided by the Onondaga Environmental Management Council; and field studies undertaken by U.S. Fish and Wildlife Service (USFWS) personnel. This report was prepared by Michael F. Stoll, Project Biologist, under the supervision of Paul P. Hamilton, Field Supervisor, USFWS, Cortland, New York. Our analysis is based on a fifty year project life.

This report has been reviewed and endorsed by the Division of Fish and Wildlife, New York State Department of Environmental Conservation, as signified by the attached letter from Director Kenneth F. Wich, dated September 29, 1983 (Exhibit 1).

DESCRIPTION OF THE PROJECT

The project (Figure 1) entails modification of the Main and West Branches of Limestone Creek and the confluence of Main Branch Tributary Nine. About 1,175 feet will be changed from natural channel to a uniform VSL Hydro Lining (VSL) lined channel 35 feet wide at the bottom with a side slope ratio of 1 on 2. A similar side slope ratio would be provided throughout the project. The above reach will be joined to about 1,200 feet of diversion channel constructed of VSL. The upper 1,025 feet will have a bottom width of 30 feet and the lower 175 feet a bottom width of 50 feet. An earth and VSL open channel control weir coupled with an instream flow splitting device will be constructed at the upstream juncture of the Main Branch and diversion channel. The control weir opening will be designed to pass an initial instream flow of 400 cubic feet per second (cfs) to the portion of the Main Branch between the weir and the confluence with the West Branch. The portion of mainstream parallel to the diversion channel will be excavated below the existing grade to provide proper downstream movement of instream flows. The channel thus created will not be lined with VSL, but will contain naturally occurring materials. At the confluence (downstream end of the diversion channel) about 325 feet of the Main and 200 feet of the West Branches will be lined with VSL. The upstream and downstream ends of the continuous VSL channel resulting from the project will be riprapped. Relocation of the confluence of Main Branch Tributary Nine and a low flow channel will also be included in this project designed to protect against a 100 year flood event. Relocation of Main Branch Tributary Nine may require use of a three or four sided concrete culvert to provide structural integrity and an open channel 50 feet wide with a 3 foot bottom width. Lastly, it has been suggested that a parcel of land adjacent to the West Branch between NYS Route 173 and the diversion channel be dedicated to pasture or parkland as mitigation for a portion of the obvious losses of fish and wildlife habitat.

AQUATIC AND TERRESTRIAL RESOURCES

The 5.5 miles of the Main Branch and 1.44 miles of the West Branch are bounded downstream by the Feeder Canal Dam in Fayetteville, New York and upstream by Edwards and Brickyard Falls respectively. Two important tributaries, Main Branch Tributary Nine and West Branch Tributary One provide excellent trout spawning habitat. The entire mainstream area is classified by the NYSDEC as C(t) (6NYCRR899.4). Class C waters are suitable for fishing and any other uses except as a source of water supply for drinking, culinary or food processing purposes. The (t) means that the water body is suitable for trout and the water quality specification for dissolved oxygen of not less than 5.0 parts per million applies.

The NYSDEC (1970) and the USFWS (1983) report that the area influenced by the project supports a high quality coldwater (trout) fishery. The NYSDEC has placed it among the top 50 trout streams of the State. Excellent stream channel configuration, instream structure and substrate, variable instream flow regime, water quality, aquatic and riparian vegetation, and forage base provides for a superb aquatic habitat both in the Main and West Branches and the two important tributaries. Additionally, Main Branch Tributary Nine and West Branch Tributary One are known to support trout spawning.

Brown and rainbow trout are reported from the project area both by the NYSDEC and USFWS. Recent contact with NYSDEC, Cortland, New York indicates continued stocking of brown and rainbow trout. In addition to the trout mentioned above, the following species were collected by the USFWS during sampling in 1982: chain pickerel, cutlips minnow, bluntnose minnow, blacknose dace, longnose dace, creek chub, fallfish, pearl dace, white sucker, northern hog sucker, stonecat, banded killifish, rock bass, pumpkinseed, fantail darter, mottled sculpin, and slimy sculpin. The ratio of trout to non-trout species varies from 1:1 in the tributaries to 1:25 in the Main Branch. Detailed information on fish captures, trout to non-trout ratios, and the forage base are provided in Tables 1 thru 3.

While there is no formal fisherman access in the project area or the area influenced by it, informal access is obtained at the several road crossings, the Village of Manlius Park, and some private properties such as P&C Foods. A specific number of angler use days is unavailable, however, fishermen were observed by USFWS personnel during the 1982 field studies. In fact, the reach of the Main Branch to be significantly altered, on the basis of discussions with fishermen, is an apparent favorite of local fishermen.

Land use adjacent to the creek in the project area consists of urbanized areas, light industry, bottomland forest (16 acres of mostly wooded upland), parkland, and scrub-shrub to mixed forest. The mixed forest on the hillsides near the creek is predominately northern deciduous hardwoods with scattered conifers. Some species of deciduous woody vegetation and herbaceous understory observed in the riparian zone of the project area were boxelder, black locust, eastern cottonwood, sugar-maple, black willow, elm, honeysuckle, dogwood, raspberry, multiflora rose, wild grape, virginia creeper, coltsfoot, goldenrod, and daisy fleabane (see Table 4 for complete listing).

The narrow band of riparian vegetation bordering much of the stream provides excellent habitat for a variety of wildlife. White-tailed deer (Odocoileus virginianis), raccoons (Procyon lotor), muskrats (Ondatra zibethica), eastern cottontail rabbits (Sylvilagus floridanus), mallards (Anas platyrhynchos), crows (Corvus caurinus), and other avians were observed in conjunction with the 1982 field work. The Fayetteville Bird Preserve is located along the Main Branch just east of Sweet Road at Audubon Road in the Village of Fayetteville downstream of the project area, and surrounded as it is by a heavily urbanized area, it provides a resting and breeding area for wildlife that venture into the surrounding area to feed. This function enhances its value.

The bald eagle (Haliaeetus leucocephalus) and the peregrine falcon (Falco peregrinus) may make transitory use of, but are not known to be residents of the area (USFWS - 1982 and NYSDEC - 1979). The Federally listed small whorled pogonia (Isotria medeoloides) is reported from the Limestone Creek drainage, but since it requires a dry wooded with acid soil habitat (Gleason - 1963) it is not likely found in the project area. Several other species of fish and wildlife found in the project area are provided protection by NYS, however, only the above are provided special protection under threatened and endangered status by NYS or the Federal Government.

PROJECT IMPACTS ON AQUATIC AND TERRESTRIAL RESOURCES

The project will result in the following impacts: potential degradation of water quality, alteration of stream channel, alteration of instream flows, and alteration of riparian and terrestrial vegetation. The effect on fish and wildlife resources will depend on the extent of alteration. The first of these impacts would be primarily short term only, while the rest have a potential for both short term and long term impacts. The 16 acres of mostly wooded upland behind Tyler Court with construction of the diversion channel will become a grassed island with a band of riparian vegetation along the northern shore between the main stream and the diversion channel. Hence, the habitat will change from mostly wooded upland to a grassed island with a riparian edge between the disturbed natural channel and the barren VSL lined diversion channel. The disturbed natural channel will only support fish and wildlife resources if it is returned to as near natural conditions as possible after disruption.

Construction activities associated with alteration, relocation and construction of either existing channels or new channels and associated structures may result in degraded water quality due to increased sediment loading or introduction of foreign materials. Increased sediment loading as a result of disturbance of the existing land formations for the required channel configuration to facilitate placement of the VSL and the disturbed natural channel and stone riprap should be temporary and easily minimized through use of proper construction methods.

Of greater concern is the potential harmful effect the supernatant from the concrete grout pumped into the nylon fabric (grout & fabric = VSL) may have upon the indigenous fish population, particularly trout. According to the Aquatic Life Advisory Committee a range in pH of 6.5 to 8.5 is desirable to maintain the productivity of water for aquatic life (Lager - 1966). According to a recent communication with your staff, provided the concrete grout is pumped "...at a pumping rate of 12 cubic yards of concrete grout per hour (the output of a typical pump), an instream flow of 5.4 cfs is required to limit the rise in pH to 1.0. The average flow for the Main Branch of Limestone Creek in the Village of Manlius is about 100 cfs; a typical dry summer day flow is about 30 cfs, and the record low is about 1 cfs." Any mechanism which could significantly alter dissolved oxygen, pH and/or temperature levels could adversely affect the indigenous aquatic populations.

Stream channel alteration and pumping of the concrete grout will have the following adverse effects: the invertebrate population with few exceptions will be destroyed; all aquatic vegetation will be destroyed; and the indigenous fish will move into nearby habitat, which would stress the individuals already there and result in decreased fish populations. The relocation of Main Branch Tributary Nine will cause at best a temporary interruption of free movement of fish between it and the Main Branch. If free movement of fish is blocked the coldwater fishery may be lost, reduced, or become totally dependent on stocking. In areas where the only alteration is placement of riprap, some aquatic invertebrates and vegetation may survive. Losses of riparian or terrestrial vegetation will decrease the value of the habitat for wildlife.

Moreover, reduction of riparian vegetation will decrease the shading effect it has on the stream, resulting in higher instream temperatures. The recommended maximum temperature is 70°F for rainbow trout and 75°F for brown trout (Scott & Crossman - 1973). A significant rise in temperature would decrease the value of the existing coldwater fishery. At this time it is not possible to quantify the rise in instream temperatures which may occur as a result of the project.

PLAN OF DEVELOPMENT FOR AQUATIC AND TERRESTRIAL RESOURCES

In order to protect, to the extent possible, the existing coldwater fishery, a plan should be developed by the U.S. Army Corps of Engineers (USACOE) in cooperation with and approved by the NYSDEC, USFWS, the U.S. Soil Conservation Service (USSCS), and the U.S. Environmental Protection Agency (USEPA) to minimize the amount of project caused siltation, alteration of water quality and/or instream flows, and losses of riparian and terrestrial vegetation.

We still have strong reservations about the VSL portion of the channel. Although the fish losses may be partially mitigated through inclusion of a low flow channel configuration, we have little idea of the degree of mitigation that will be achieved. We therefore strongly urge that a post-construction study be authorized and funded to determine fish use of this potentially precedent setting project feature.

The latest design information indicates that the first 300 to 400 cfs of instream flow will pass down the natural channel past the control weir. Moreover, the USACOE should work closely with the NYSDEC and the USFWS in developing the low flow channel configuration.

The control weir should be designed to pass, in both directions, brown trout which have a recognized sustained swimming speed of 2.2 to 6.2 feet per second (Lowman - 1974). To mitigate for fish losses and assure their passage, the proposed open box culvert is preferable to a round culvert. The bottom of the control weir should be placed at least 0.5 feet below the stream bottom and lined with a substrate similar to that found in the natural channel. Ideally a water depth of about 0.75 feet should be maintained in the control weir and not allowed to drop below 0.25 feet at any time. Ideally the gradient should not exceed 1/2 of 1 percent (Gebbards - 1972) nor the velocity 4.2 feet per second within the control weir. Higher velocities can be tolerated for short periods, but should not exceed 48 hours in duration. Resting pools should be provided at both the downstream and upstream ends of the control weir. The blocks mentioned in your letter of June 15, 1983 should be added to lower the velocity below the 8.0 feet per second to assist fish in passing.

The initial pumping of the concrete grout into the nylon fabric pillow of the VSL should be carefully monitored to provide early detection of unacceptable levels of at least dissolved oxygen and/or pH. These parameters should be held as close to ambient as possible to prevent undue loss of aquatic life. In the event of a large variation or fishkill, pumping of the concrete grout should cease or be slowed and remedial action taken.

All areas disturbed as a result of construction activities should be revegetated as soon as possible upon completion of the project to mitigate lost wildlife habitat. The destruction of vegetation should be kept to a minimum or avoided altogether since it develops slowly and cannot be readily replaced. A strategy for minimizing destruction of vegetation and a revegetation plan should be developed for the project in cooperation with and approved by the NYSDEC and the USFWS. The plan should include provisions for monitoring of growth conditions to ensure that revegetation is successful. All replanting, maintenance of replanted vegetation, and associated monitoring activities should be funded as project costs.

It has been suggested that a parcel of land adjacent to the West Branch between NYS Route 173 and the diversion channel be dedicated to pastureland, to parkland, or to a natural area as mitigation for adverse effects on the habitat resulting from the project. It should be dedicated as parkland or a natural area to enhance its value to wildlife. There should also be provisions made for additional fishermen access within the area influenced by the project to mitigate losses to the fishery.

RECOMMENDATIONS

1. To mitigate fish losses and assure continued free movement of fish within the area influenced by the project the passage in the control weir and the final low flow channel configuration should be designed in cooperation with and approved by the NYSDEC, USFWS, and USEPA.

2. To minimize the amount of project caused erosion, siltation and water pollution during and immediately after construction a plan should be developed in cooperation with and approved by NYSDEC, USFWS, USEPA, and USSCS.

3. To minimize the loss of fish and/or aquatic organisms, the VSL should be constructed in the dry where possible and when this is not possible construction should begin at the downstream end to allow the greatest dilution possible to occur over a disturbed bottom. Initial pumping of the concrete grout should be closely monitored by the USACOE in coordination with the NYSDEC and USFWS.

4. To mitigate both fish and wildlife losses, destruction and/or alteration of both riparian and terrestrial vegetation should be avoided during construction. A revegetation plan should be developed for the project in cooperation with and approved by the NYSDEC and USFWS. The plan should include provisions for monitoring growth to ascertain successful revegetation.

5. To mitigate losses of fish and wildlife habitat

> 1) the resulting island between the diversion channel and the Main Branch should be dedicated to parkland or to a natural area and vegetated accordingly;

2) a narrow band of riparian vegetation, preferably the existing, should be maintained along the north edge of the above island;

3) the parcel next to the West Branch should be dedicated to parkland or a natural area and vegetated accordingly; and

4) fishermen access should be provided within the area influenced by the project.

6. Future fisheries surveys, funded by the project at a cost of $12,000, should be undertaken to determine the success or failure of measures provided in the final project plan, particularly as they relate to fish passage. The studies should be conducted by FWS in cooperation with NYSDEC.

7. To mitigate for fish losses caused by the placement of 1,175 feet of VSL in the main stream of Limestone Creek, stream improvement structures should be constructed in the disturbed natural channel opposite the VSL diversion channel. Design should be made in cooperation with the New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service. Estimated cost is approximately $10,000.

Please continue to coordinate this project with us as it develops, and advise us of any changes or additions to the project so that consideration may be given to revise or supplement this report.

Sincerely yours,

Paul P. Hamilton

Paul P. Hamilton
Field Supervisor

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FIGURE 1.
(Not to scale)

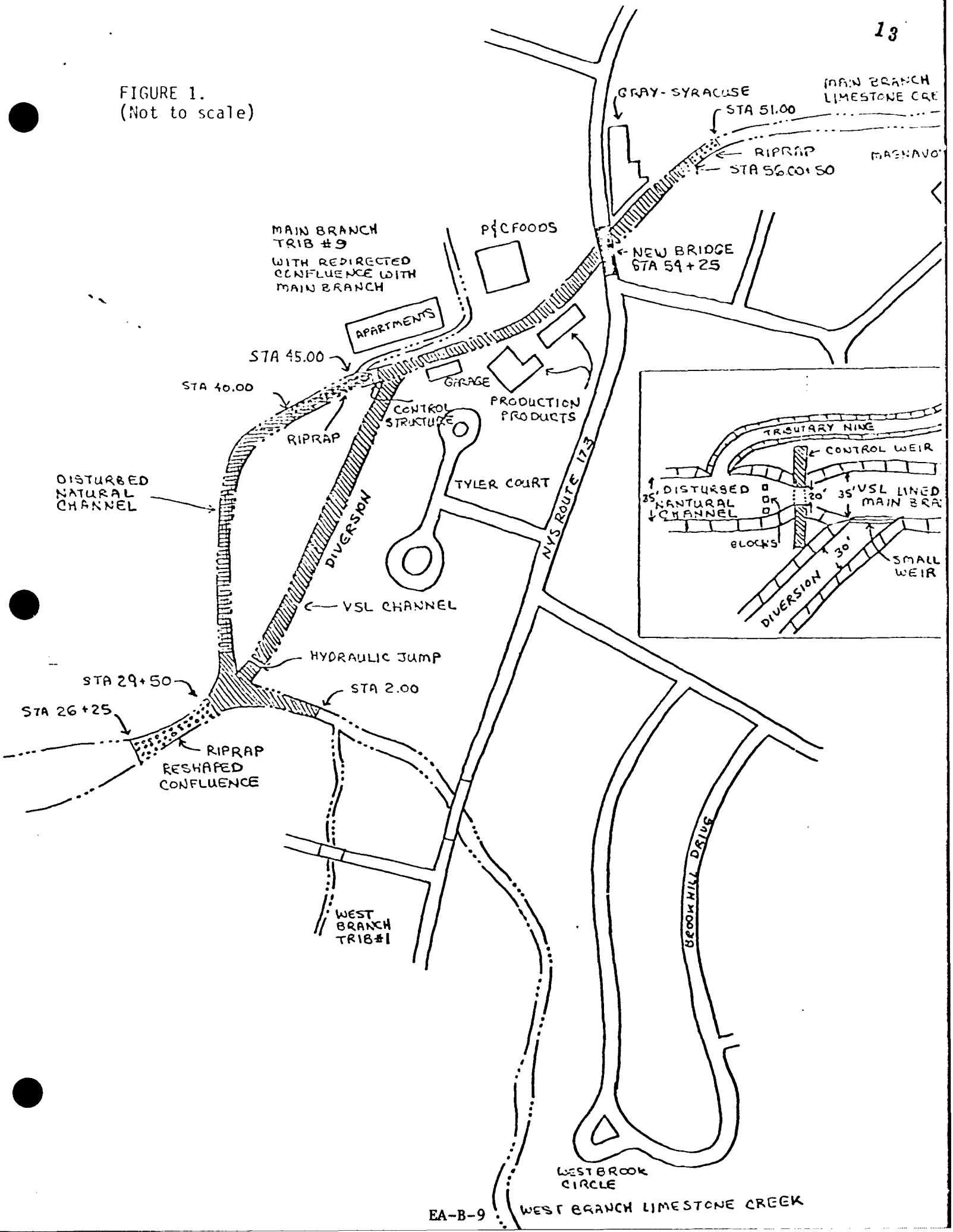


EXHIBIT 1

14

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-0001

Henry G. Williams
Commissioner

September 29, 1983

Mr. Paul P. Hamilton
Field Supervisor
U.S. Fish and Wildlife Service
100 Grange Place
Room 202
Cortland, New York 13054

Dear Mr. Hamilton:

This is in response to your letter of September 20, 1983 and your enclosed draft Final Fish and Wildlife Coordination Act Report for the proposed flood control project on Limestone Creek, Town of Manlius, Onondaga County, New York.

While both the proposed project and your recommendations have been modified since our concurrence letter of May 3, 1983, these changes were coordinated with our regional staff. We, therefore, concur with your Final Fish and Wildlife Coordination Act Report draft dated September 20, 1983 and note that it is consistent with our earlier letter of concurrence.

Thank you for the opportunity to comment.

Sincerely,

Kenneth Wich

Kenneth F. Wich
Director
Division of Fish and Wildlife

TABLE 1

FISH CAPTURE INFORMATION - COMBINED SPRING, SUMMER AND FALL RESULTS 1982 FOR THE LIMESTONE CREEK FLOOD CONTROL PROJECT AT MANLIUS, NY (USFWS - 1983)

SPECIES	Sta. at Up-Stream End #	Ave. Len.	Sta. at Center #	Ave. Len.	Sta. at Do-wnstr. End #	Ave. Len.	Sta. in Trib. Nine #	Ave. Len.	Total # Fish
Rainbow trout Salmo gairdneri	1	21.3							1
Brown trout Salmo trutta	8	14.5	10	15.4	2	14.1	38	9.1	58
Chain pickerel Esox niger					1	8.5			1
Cutlips minnow Exoglossum maxillingua	4	8.5	9	8.9	3	9.2			16
Cyprinid Notropis sp.					3	4.4			3
Bluntnose minnow Pimephales notatus	2	7.6			6	6.3			8
Blacknose dace Rhinichthys atratulus	18	6.3	26	6.6	16	5.4	4	7.9	64
Longnose dace Rhinichthys cateractae	8	8.8	2	6.9			1	8.7	11
Creek chub Semotilus atromaculatus					1	8.0			1
Fallfish Semotilus corporalis	1	10.6	6	8.4					7
Pearl dace Semotilus margarita	10	5.6	3	6.1	5	5.3			18
White sucker Catostomus commersoni	46	22.5	8	21.4	11	9.9			65
Northern hog sucker Hypentelium nigricans			1	15.2	1	22.3			2
Stonecat Noturus flavus	1	5.5							1
Banded killifish Fundulus diaphanus					1	6.4	1	6.5	2
Rock bass Ambloplites rupestris					1	12.4			1
Pumpkinseed Lepomis gibbosus			8	8.1	3	8.7			11
Fantail darter Etheostoma flabellare	7	6.2	3	5.6					10
Johnny darter Etheostoma nigrum			6	7.0	1	5.6			7
Mottled sculpin Cottus bairdi	20	6.6	9	5.6	2	5.1	17	7.4	48
Slimy sculpin Cottus cognatus					2	6.1	2	6.7	4
TOTALS	126		91		59		63		339

NOTE: Ave. Len. = Average Length is in centimeters.

TABLE 2

RATIO OF TROUT TO NON-TROUT FISH SPECIES FOR VARIOUS REACHES OF LIMESTONE CREEK BETWEEN THE FEEDER CANAL DAM AND EDWARDS AND BRICKYARD FALLS AFFECTED BY THE LIMESTONE CREEK FLOOD CONTROL PROJECT AT MANLIUS, NEW YORK AS EXTRACTED FROM THE 1983 USFWS REPORT.

STREAM REACH	RATIO
Overall within the project area	1 : 5
Main Branch portion of the project area	1 : 25
Main Branch Tributary Nine portion of the project area	2 : 1
Overall Feeder Dam to both Edwards and Brickyard Falls	1 : 8
West Branch to Brickyard Falls	1 : 12
Main and West Branch tributaries	1 : 3
Main Branch Tributary Nine	1 : 1
West Branch Tributary One	1 : 1
Overall Feeder Dam to only Edwards Falls	1 : 9

TABLE 3

INVERTEBRATES FROM THE LIMESTONE CREEK FLOOD CONTROL PROJECT AT MANLIUS, NEW YORK AREA (USFWS - 1983) SUMMER 1982

Species	Station at Upstream end of Project	Station at Center of Project	Station at Downstream End of Proj.	Station in Tributary Nine	Total #
Aquatic earthworm Unidentified sp.				9	9
Leech Unidentified sp.				2	2
Scud Gammarus	1	22	1	156	180
Mayfly Ephemerella	25	1			26
Mayfly Heptagenia	54				54
Caddisfly Hydropsyche	12		7		19
Caddisfly Unidentified sp.	1	2			3
Whirligig beetle Gyrinus sp.	1	1		2	4
Limid Stenelmis		1			1
Cranefly Antocha	1				1
Cranefly Erophidolabis	1				1
Blackfly (larvae) Simulium sp.	7	6	3	3	19
Midge (larvae) Unidentified sp.	54	16	19	55	144
Midge (pupae) Unidentified sp.	1		1		2
Snail Physa				1	1
Snail Unidentified sp.				2	2
TOTALS	158	49	31	230	468

TABLE 4

VEGETATION REPORTED FROM THE LIMESTONE CREEK FLOOD CONTROL PROJECT AT MANLIUS, NEW YORK AREA SUMMER OF 1982 (USFWS-1983)

SPECIES	Sta. at up-stream end of project	Sta. at do-stream end of project	Sta. at center of project	Sta. in Tributary Nine
TERRESTRIAL WOODY				
Basswood				
Tilia americana	X			
Boxelder				
Acer negundo		X		X
Sycamore				
Platanus occidentalis	X			
Black locust				
Robinia pseudoacacia		X		X
Eastern cottonwood				
Populus deltoides	X	X		X
Sugar-maple				
Acer saccharum	X	X		
Willow sp.				
Salix sp.	X	X		
Black willow				
Salix nigra	X	X	X	
Elm sp.				
Ulmus sp.		X		X
Honeysuckle sp.				
Lonicera sp.		X		X
Dogwood sp.				
Cornus sp.	X	X		X
Staghorn sp.				
Rhus typhina				X
Raspberry sp.				
Rubus sp.	X	X	X	
Multiflora rose				
Rosa multiflora		X		X
Wild grape				
Vitis sp.	X	X		
Virginia creeper				
Parthencissus quinquefolia	X			X
Nightshade				
Solanum dulcamara				X
TERRESTRIAL HERBACEOUS				
White snakeroot				
Eupatorium rugosum				X
Coltsfoot				
Tussilago fanfara	X	X		X
Grass sp.				
- - - -		X	X	X
Gill-over-the-ground				
Glecoma hederacea		X		

TABLE 4 (Continued)

VEGETATION REPORTED FROM THE LIMESTONE CREEK FLOOD CONTROL PROJECT AT MANLIUS, NEW YORK AREA SUMMER 1982 (USFWS-1983)

SPECIES	Sta. at up-stream end of project	Sta. at do-stream end of project	Sta. at center of project	Sta. in Tributary Nine
TERRESTRIAL HERBACEOUS (Continued)				
Aster				
Aster sp.		X		
Goldenrod				
Solidago sp.	X	X	X	
Burdock				
Arctium minus			X	
Purple looestrife				
Lythrum salicaria		X		
Beggar - tick				
Bidens sp.	X			
Sow-thistle sp.				
Sonchus sp.	X			
Milkweed				
Asclepias sp.		X		
Curled dock				
Romex crispus			X	
Jewel-weed				
Impatiens biflora	X			
Sunflower				
Helianthus sp.		X		
Daisy fleabane				
Erigeron annus	X	X		X
Mint sp.				
Mentha sp.		X		
Speedwell				
Veronica sp.		X		
Flowering raspberry				
Rubus odoratus		X		
AQUATIC SUBMERGENTS				
Chara				
Chara sp.				X
AQUATIC EMERGENTS				
Softstem bulrush				
Scirpus validus		X		
AQUATIC ON DAMP SOIL ABOVE THE WATERLINE				
Sedge				
Carex sp.		X		
Iris				
Iris sp.		X		
Horsetail				
Equisetum sp.		X		

LIMESTONE CREEK - SECTION 205
AT MANLIUS, NEW YORK

ENV. APPEN. C - SECTION 404(b)(1) PUBLIC NOTICE AND EVALUATION REPORT

U.S. Army Corps of Engineers
Buffalo District

DEPARTMENT OF THE ARMY

BUFFALO DISTRICT, CORPS OF ENGINEERS

1776 NIAGARA STREET

BUFFALO, NEW YORK 14207

PUBLIC NOTICE

LIMESTONE CREEK
FLOOD DAMAGE REDUCTION PROJECT
AT MANLIUS, NEW YORK

This Public Notice is being distributed to identify what dredged or fill material would be discharged into waters of the United States by implementation of the project proposed by the Section 205 Flood Control Project for Limestone Creek at Manlius, NY. The project involves the reduction of flood damages caused by Limestone Creek overtopping its bank at Manlius, NY, by implementation of channelization and erosion protection measures (Reference Figure 1 of the attached Section 404 evaluation report). These measures could require that approximately: 3,000 cubic yards of limestone riprap; 2,550 cubic yards of bedding stone; 5,700 cubic yards of fabric-formed concrete; 100 linear feet of steel sheet pile (water control structure); 400 cubic yards of clean earthen fill; several hundred cubic yards of precast concrete block; and about 350 cubic yards of concrete (piers associated with construction of a new Route 173 bridge) be placed into the creek channel. A Section 404 Evaluation report is included with this Public Notice which only evaluates the proposed impacts of the deposition of the aforementioned materials into Limestone Creek.

This project is being reviewed under the following applicable laws:

a. National Environment Policy Act, as amended, 42 USC 4321, et seq.

b. Clean Air Act, as amended, 42 USC 7401, et. seq.

c. Clean Water Act, as amended (Federal Water Pollution Control Act), 33 USC 1251, et seq.

d. Watershed Protection and Flood Prevention Act, 16 USC 1001, et seq.

e. Fish and Wildlife Coordination Act, as amended, USC 661, et seq.

f. Endangered Species Act, as amended, 16 USC 1531, et seq.

g. Land and Water Conservation Fund Act, as amended, 16 USC 4601-4601-11, et seq.

h. Federal Water Project Recreation Act, as amended, 16 USC 460-1(12), et seq.

i. Archeological and Historic Preservation Act, as amended, 16 USC 469, et seq.

j. National Historic Preservation Act, as amended, 16 USC 470a, et seq.

The proposed placement method would involve use of heavy construction equipment to place riprap and bedding stone, concrete, sheet piling, and earth backfill. Work would be performed with dump trucks (to haul stone to the project site), a rubber tired front-end loader (to carry stone from the dump site to the creek bank); a bulldozer to do grading work; a clamshell or crane to place heavy riprap; a backhoe to place lighter weight riprap, bedding, and earth backfill; pile driver to install sheet piling and, a cement mixer (truck and/or portable) - which would include a pump and hoses.

With regard to installation of fabric form lining and grout; this construction activity would be carried out under low pumping pressure. Mixers used to batch the water, cement (also an additive to obtain the desired consistency and setting time) and aggregate would be kept out of the creek channel, and precautions (i.e. low temporary berm around mixers and pumps on the top of bank) would be taken to prevent or minimize the potential for accidental spillage of such fill material back into the creek. Hose connections associated with pumping grout into fabric form lining would be secured and monitored to prevent accidental excess leakage of grout into the creek. Fabric form lining would be placed over the graded creek channel and bank slopes and grouting would begin at the lowest elevation within the lining. As each fabric section is filled, the injection tube nozzle and hose would be withdrawn from the fabric after the pump is shut off, and the tube nozzle would be placed into a container (i.e. metal drum) to minimize potential grout leakage. During grouting operations, the lining would adapt itself to the existing ground profile and would become a concrete slab of irregular thickness.

The water control structure would be constructed of steel sheet piling to form a water deflecting wall; this control structure would then be backfilled on its upstream and downstream sides with clean gravelly sandy silt material obtained from the proposed terrestrial diversion channel. The heavy precast concrete blocks would be randomly placed and set in the channelized creek bed within the creek reach located downstream of the proposed control structure. Such blocks would be placed in locations specified by the NYS Department of Environmental Conservation. This activity will be scheduled for late summer and/or fall, if possible, to minimize impacts on any possible spring and early summer fish spawning and wildlife nesting and/or brooding along the creek.

Also, the Corps of Engineers Civil Works Construction Guide Specification entitled "Environmental Protection" (CW-0143 July 1978) would be followed to help minimize adverse impacts on the aquatic ecosystem. A Contractor doing the project work would be required to keep construction activities under surveillance; monitoring management and control in order to avoid pollution of water resources, and to minimize disturbance and damage to fish and wildlife.

This area, where the placement of the materials will occur has not been previously designated by the Administrator of the Environmental Protection Agency (EPA) as a disposal site.

The New York State Department of Environmental Conservation (NYSDEC), in a letter dated 6 August 1979 (on file at the Buffalo District Office) has stated that when they are the local cooperator on a flood control project, the requirement for the Buffalo District to obtain a 401 Water Quality Permit is waived. NYSDEC is the local cooperator on the Limestone Creek flood damage reduction project.

The latest published version of the National Register of Historic Places has been consulted. There are no registered properties or properties listed as being eligible for inclusion therein that will be affected by this project. As per information obtained through a cultural resources reconnaissance survey performed in July 1981 and subsequent coordination thereof; no significant cultural resources should be affected by the proposed project. By this notice, the National Parks Service is advised that presently unknown archeological, scientific, prehistorical, or historical data may be lost or destroyed by work to be accomplished under the requested permit.

This Section 404 Public Notice and Evaluation Report is being distributed to local, State, and Federal interests as part of the Draft Detailed Project Report, Draft Environmental Impact Statement, and Appendices entitled: Limestone Creek, Manlius, NY.

The Buffalo District Engineer must evaluate the impacts of the discharge of dredged or fill material into the waters or wetlands of the United States, as promulgated by the Administrator of the USEPA using Section 404(b)(1) Guidelines of the Clean Water Act (40 CFR 230). Therefore, any person who has an interest which might be affected by the proposed discharges may request a public hearing. The request must be submitted in writing to the District Commander within 30 days of the date of this notice and, must clearly state the interest which may be affected and the manner in which the interest may be affected by this activity. A lack of response will be interpreted as meaning that there is no objection to the proposed work.

Correspondence pertaining to this matter should be addressed to the District Commander, U.S. Army Engineer District, Buffalo, 1776 Niagara Street, Buffalo, NY 14207, ATTN: Mr. Tod Smith. If you have any questions or require additional information, please contact Mr. Tod Smith of my Environmental Analysis Branch at 716-876-5454, extension 2173 or FTS 473-2173.

Sincerely,

Robert R. Hardiman

ROBERT R. HARDIMAN
Colonel, Corps of Engineers
District Commander

1 Enclosure
as stated

NOTICE TO POSTMASTER: It is requested that the above notice be conspicously displayed for 30 days from the date of issuance.

The following agencies, groups, and individuals will be sent copies of the Public Notice and Preliminary Section 404 Evaluation:

Congressional

U.S. Senator - Alphonse D'Amato
U.S. Senator - David P. Moynihan
U.S. Representative - George Wortley

Federal

Advisory Council on Historic Preservation
Department of Agriculture
Forest Service
Soil Conservation Service
Department of Commerce
Department of Defense
Department of Energy
Environmental Protection Agency
Federal Emergency Management Administration
Department of Health and Human Services
Department of Housing and Urban Development
Department of the Interior
Department of Transportation

State

Office of the Governor
New York State Clearinghouse
New York State Department of Agriculture and Markets
New York State Department of Commerce
New York State Department of Environmental Conservation
New York State Department of Health
New York State Department of State
New York State Department of Transportation
New York State Historic Preservation
New York State Office of Parks and Recreation
New York State Office of Planning Services
Office of the State Archeologist

Regional and Local

Central New York Regional (Planning and Development Board (A-95)
Onondaga County (Agencies)
Town of Manlius
Village of Manlius
Village of Fayetteville
Trout Unlimited
Other Regional Environmental Groups

Other Organizations and Individuals.

Individuals are not listed. A complete mailing list is on file at the U.S. Army Corps of Engineers, Buffalo District Office.

SECTION 404 EVALUATION
PROPOSED FLOOD CONTOL PROJECT
LIMESTONE CREEK, MANLIUS, NY

1. PROJECT DESCRIPTION

1.1 Introduction. Section 404 Discharges - Section 404 of the Clean Water Act (33 USC 1344) requires the evaluation of water quality effects of disposal of dredged or fill materials into navigable waters of the United States. This evaluation for the proposed Limestone Creek Flood Damage Reduction Project has been prepared using the general guidance contained in ER 1105-2-50 dated 29 January 1982, Implementation of Section 404(b)(1) Evaluation using 24 December 1980 Guidelines (40 CFR 230). It is being coordinated with the public in conformance with guidance contained in NCDPD-ER letter dated 4 September 1979, "Public Coordination of Section 404(b)(1) Evaluations. The second reference states that a Public Notice, with an attached preliminary Section 404 Evaluation should be issued at the earliest possible time.

1.1.1 The subject of this Section 404(b)(1) Evaluation is the following types of fill material that would be placed into Limestone Creek or its tributaries within the project area: (1) Bank riprap, stone placement, and random placement of some large precast concrete blocks (as fish habitat mitigation) into the creek channel reach to be channelized which is located downstream of the proposed control structure; (2) placement of riprap stone along creek bank areas in zones where there is a transition between the existing channel and the fabic formed concrete channel; (3) stone bedding material beneath riprap and on final formed concrete lined sideslopes; (4) fabric form material and concrete lining; (5) earth backfill associated with the steel sheet pile water control structure; (6) earth fill to be put into a small portion of modified tributary #9; and, (7) concrete to install piers for the new Route 173 bridge.

1.2 Location and General Description. The Village of Manlius is a small community in Onondaga County, NY, located about 8 miles south-east of the City of Syracuse in central New York State. Both Limestone Creek and the West Branch of Limestone Creek flow through the village joining just outside the corporate limits. Both branches have contributed to flooding in the past, causing property damage to residences and businesses in the community. The project involves the reduction of flood damages caused by Limestone Creek overtopping its bank at Manlius, NY, by implementation of channelization and erosion protection measures (Reference Figure 1).

1.3 Authority and Purpose. Authorization for this study is provided by Section 205 of the 1948 Flood Control Act, as amended. An investigation to determine the applicability of Section 205 was initiated in March of 1977 in response to requests by local representatives to the Corps of Engineers. A reconnaissance report was completed in July of 1977 and further detailed investigation was approved. Subsequently, the detailed planning investigation and preparation of the Detailed Project Report was initiated in October of 1982.

1.4 General Description of Dredged or Fill Material. Riprap would consist of limestone and bedding would consist of limestone or gravel obtained from a local quarry in New York State. Stone to be used would be free of significant cracks, seams, and overburden material. In order to reduce the potential for soil erosion, portions of the creek's banks would be riprapped, whereby about a 4-inch to 6-inch thick layer of bedding stone would be installed as a base, over which would be placed about a 12-inch thick layer of larger sized and heavier riprap stone. Maximum size of the bedding stone would be about 6-inches and the maximum weight of the heavier riprap stone would be about 84 pounds. Bedding stone would also be placed under the fabric formed concrete lining, where needed. The hydro-lining fabric is a formwork that would be positioned and secured in place directly upon sub-surface ground. The fabric would then be injected with concrete grout in such a way that excessive pressure on the fabric envelope is avoided. The preformed large concrete blocks to be placed onto the streambed for fish habitat (to help mitigate for loss of existing fish habitat diversity due to channelization) are estimated to weigh 600-800 pounds, are cubical in shape, and are already available for use near the creek bank location where the project is to be done.

1.4.1 Approximately 3,000 cubic yards of limestone riprap; 2,550 cubic yards of bedding stone; 5,700 cubic yards of fabric formed concrete grout; 200 linear feet of steel sheet pile for the water control structure; about 300 cubic yards of clean soil and gravel backfill material (to be obtained from the proposed terrestrial diversion channel nearby); approximately 80-100 cubic yards of clean earth fill required to fill the short abandoned end of Tributary #9 (approximately 65 feet to 80 feet long); and about 350 cubic yards of concrete for piers associated with construction of the new bridge over Route 173; would be placed into the creek channel.

1.5 Description of the Proposed Discharge Site. The main creek channel and west branch tributary consist of an interspersion of cold water riffles and pools, with a fast current flowing over a diverse rocky substrate containing stone boulders, cobbles, pebbles, and gravel of assorted sizes. Tributary #9 contains very shallow flowing water passing over a cobble, pebble, and gravelly bottom in a very narrow channel. Banks along the main channel and its tributaries are generally well shaded by riparian wooded vegetation composed of overhanging hardwood trees and shrubs, with an understory of grasses and forbs. Along much of the creek in the project zone, this riparian growth is intact despite the agricultural, residential, and commercial development that has occurred along portions of its banks. Typical vegetation along its banks are black willow, box elder, cottonwood, red maple, elm, sycamore, black locust, dogwood, sumac chokecherry, goldenrod, grasses, and jewelweed. Some parts of the main stem of Limestone Creek flow through areas where the banks are steep.

1.6 Description of the Disposal Method. The proposed disposal method would involve use of heavy construction equipment to place riprap and bedding stone, concrete, sheet piling, and earth backfill. Work would be performed with dump trucks (to haul stone to the project site); a rubber tired front-end loader (to carry stone from the dump site to the creek bank); a bulldozer to do grading work; a clamshell or crane to place heavy riprap; a backhoe to

place lighter weight riprap, bedding, and earth backfill; pile driver to install sheet piling and, a cement mixer (truck and or portable) - which would include a pump and hoses.

1.6.1 With regard to installation of the fabric form lining and grout; this construction activity would be carried out under low pumping pressure. Mixers used to batch the water, cement (also an additive to obtain the desired consistency and setting time) would be kept out of the creek channel, and precautions (i.e. low temporary earth berm around mixers and pumps on the top of bank) would be taken to prevent or minimize the potential for accidental spillage of such fill material back into the creek. Hose connections associated with pumping grout into the fabric form lining would be secured and monitored to prevent accidental excess leakage of grout into the creek. Fabric form lining would be placed over the graded creek channel and bank slopes and grouting would begin at the lowest elevation within the lining. As each fabric section is filled, the injection tube, nozzle, and hose would be withdrawn from the fabric after the pump is shut off, and the tube nozzle would be placed into a container (i.e. metal drum) to minimize potential grout leakage. During grouting operations, the lining would adapt itself to the existing ground profile and would become a concrete slab of regular thickness.

1.6.2 The water control structure would be constructed of steel sheet piling to form a water deflecting wall; this control structure would then be backfilled on its upstream and downstream sides with clean gravelly sandy silt material obtained from the proposed terrestrial diversion channel. The heavy precast concrete blocks would be randomly placed and set in the channelized creek bed within the creek reach located downstream of the proposed diversion channel. Such blocks would be placed in locations specified by the NYS Department of Environmental Conservation.

2. FACTUAL DETERMINATIONS

2.1 Physical Substrate Determinations. Riprap and bedding stone to be deposited along selected bank slope locations below the creek's normal high waterline, will be installed to protect bank areas where soil erosion could occur. Bedding stone would also be placed under fabric formed concrete lined bank slopes to provide drainage under the fabric and grout. There would be a change in substrate type from what presently exists as a more unstable cobble, gravel mixture, to more stable stone or concrete slab forms covering over such substrate.

2.1.1 Clean earth excavated from the proposed diversion channel and used as backfill for the water control structure, would cover over some existing substrate in the channel. Steel sheet piling for the water control structure would be anchored into the creek bed substrate. This control structure would help stabilize channel substrate, because it would reduce peak discharges during flooding periods.

2.1.2 Some short-term unavoidable cement leakage onto creek substrate could occur during cement grouting or pouring operations, however, precautions and monitoring would be implemented to prevent or minimize

accidental spillage. Since the specific gravity of cement is greater than water, most excess cement discharge should rapidly sink to the creek bottom and any associated liquid discharge should readily dissipate downstream and be diluted by the rapid flow of creek water.

2.1.3 Cement blocks placed onto the channelized creek bed to help mitigate for loss of fish habitat would add some large sized man-made artificial substrate to the creek. Therefore, installation of the various aforementioned types of fill will alter the existing physical substrate to some degree over at least the anticipated life of the project.

2.1.4 The Onondaga County Soil Survey Report identifies the terrestrial bank areas along the creek in the project area as Teel silt loam. Placement of stone fill or fabric formed concrete on the creek bank slope and bottom will cover this finer soil type with a rougher surface, and the original contour elevation of the banks and channel bottom would change to some degree. Heavy stone or fabric formal concrete placed over the silt loam on the banks would contribute to some soil compaction. Also, placement of stone into the excavated toe trench of the channel bed at the base of riprapped slopes, would provide a rough limestone substrate to replace some of the existing stone substrate that was excavated from the channel.

2.2 Water Circulation, Fluctuation, and Salinity Determinations. An increase in water velocity at the sheet pile control structure immediately downstream of the structure would occur. Beyond the riprapped bank just below the sheet pile control structure, water velocities would return to existing conditions. Where fabric formed concrete is installed, water velocities would significantly increase. However, downstream of the confluence where fabric formed concrete ends, there would be a riprapped bank transition zone beyond which surface water flow profiles would return to existing conditions. Cement blocks placed in the creek bed to mitigate for loss of existing fish habitat in the existing creek reach to be channelized in the area downstream of the proposed control structure, would help diversify the current pattern to some degree. Under existing conditions, natural stone substrate in the creek bed contributes to a variety of current patterns in this swift flowing creek. However, the proposed project would remove some of that existing stone during installation of riprap or fabric formed concrete, but still replace it with a rough stone or concrete surface area that would create some water turbulance.

2.3 Suspended Particulate/Turbidity Determinations. Some unavoidable temporary water turbidity and particulate resuspension will occur from disturbance of silt and detritus during construction installation of fill material. Also, a small amount of oil, grease, and fuel spill may occur during operation of heavy equipment which could contribute to short-term turbidity. The potential for suspended particulate and turbidity impacts will be minimized, since it is anticipated that construction work would be done during the summer low-flow period when water in the creek channel is shallow, and because the Contractor will be required to follow the Corps Construction Guide Specifications for Environmental Protection (CW-01430 dated July 1978). Under existing conditions, the creek channel is periodically subjected to increased sediment and silt loads as well as suspension of particulates during storm runoff periods.

2.4 Contaminant Determinations. Riprap and bedding quarry stone and concrete blocks would be basically inert. Earth fill material to be obtained from the proposed diversion channel adjacent to the creek for use as backfill behind the steel sheet pile water control structure, appears to meet exclusion criteria for testing the chemical-biological interactive effects outlined in 40 CFR 230.4 - 1(b), (2), and (3), and no further testing on this material will be conducted. Such materials may be excluded from the aforementioned testing if any of the exclusion criteria as defined in 40 CFR 230.4 - 1(b)(i), (ii), or (iii) are met. Briefly stated, these exclusion criteria are (i) that the dredged material is composed predominantly of sand, gravel, or other naturally occurring sedimentary material with particle sizes larger than silt, usually found in high energy environments; (ii) that the material is suitable and being used for beach nourishment; (iii) that the material proposed for discharge is primarily the same as at the proposed discharge site. This final criteria requires that the dredged material is sufficiently removed from sources of pollution to provide reasonable assurances that the material is not polluted from such sources, and that adequate conditions are provided on the disposal method to provide reasonable assurance that the discharged material will not be moved by currents or otherwise in a manner that is damaging to the environment outside the disposal area. The natural sediments in the vicinity of the channel bed of the project area are relatively unpolluted, which contributes to the high quality of Limestone Creek as one of the top trout streams in the State.

2.4.1 The composition of cement would consist primarily of calcium silicates and water. If needed, there could be an additive included to expedite hardening, increase workability, pumpability, strength, or increase watertightness of the grout. Pozzolith (a silicaceous type of material) or an equal water reducer may be used for such purposes. The mixing time for each batch of cement after all solids are in the mixing drum - provided that all the mixing water is introduced before one-fourth of the mixing time has elapsed - would be not less than 1 minute for mixers having a capacity of 1 cubic yard; for mixers having larger capacities, the minimum mixing times would be increased about 15 seconds for each additional 1/2 cubic yard or fraction thereof of grout mixed. The estimated setting time for grout pumped into the fabric form lining would be about 1 hour. As mentioned previously in paragraphs 1.6 and 2.1, precautionary measures would be taken to prevent and/or minimize accidental leaching of cement effluent into the creek channel and water. Also, creek water would be monitored to insure pH levels do not vary significantly from pH levels that exist in the creek at the time of construction, if some of the concrete slurry does escape into the creek.

2.5 Aquatic Ecosystem and Organism Determinations. Fill placed into the creek channel will destroy, displace, or disrupt aquatic organisms in the construction project zone. These adverse impacts would be due to: (1) disturbance and resettlement of silt and sediment over the creek bed substrate; (2) reduction of existing aquatic fish habitat diversity (now provided by riffles, pools, scattered boulders, cobblestones, filamentous algae and overhanging vegetation) due to excavation during channelization and installation of riprap and covering by concrete and earth backfill; (3) water turbidity during construction which would cause short-term reduction in photosynthesis activity, (primarily of filamentous algae), and also may aggravate

gill breathing systems of fish and drive fish temporarily out of the disturbance area; (4) some sedentary bottom dwelling invertebrates would be destroyed by excavation and their habitat covered over by riprap, earth backfill, and concrete. The fabric formed concrete would cover over the original aquatic substrate and function in a manner similar to a hard irregular surface, which would eventually be recolonized with some species of benthic organisms and filamentous algae.

2.5.1 In order to help minimize adverse impacts on aquatic organisms in the creek, work would be accomplished during the summer low-flow period, however, if construction extends into late fall, there could be some disturbance on brown trout spawning. Some short-term rise in creek water pH could occur during installation of concrete grout if some cement elutriate seeps through the fabric form lining. However, pH would be closely monitored during the grouting operation to keep water pH within acceptable limits needed by aquatic life in the creek. The grouting operation would temporarily cease if creek water pH appeared to be approaching an unacceptable limit, and would resume when the pH level was once again within the acceptable range. Backfill over the short portion of tributary #9 would cover over a short portion of this narrow trout spawning stream (65-80 linear feet) and reroute the tributary back into the main creek channel via a new proposed tributary section estimated to be about 450 feet long.

2.5.2 There are no known significant commercial freshwater shellfish reported within the project area; therefore, no significant impact on this type of resource is anticipated.

2.5.3 Riprap, earth backfill, and concrete placement onto ripparian soils will preclude growh of vegetation. Interstices among riprap stones may provide cover habitat for a few mammal species (i.e. rodents such as rabbits and mice) to some degree. Also, eventual accumulation of windblown soil or waterborn silt among some of the riprap interstices may create conditions conclusive to establishment of some natural plants that may be used as food or cover by wildlife. With regard to threatened or endangered species, the U.S. Fish and Wildlife Service indicated in a letter dated 26 April 1982 that, except for occasional transient species, no federally listed or proposed threatened or endangered species under their jurisdiction are known to exist in the project impact area. Also, the New York State Department of Environmental Conservation indicated by telephone on 25 April 1983 that there is no critical or significant habitat in the Manlius area. Therefore, no significant impact on such species or habitat is anticipated by installation of the proposed fill material.

2.5.4 Since there are no wetlands in the potential project zone, the proposed fill material would not cover or alter this type of resource; therefore, no significant impact is anticipated. The nearest wetland is located about 2-1/2 miles outside the lower limit of the Manlius, NY, project site.

2.6 Proposed Disposal Site Determinations. Approximate normal water depth in the vicinity of the fill area is about 1-1/2 feet± and water velocity ranges from about 4 to 15 feet per second in the creek. Since all or most of the construction would occur during the summer low-flow period the

mixing zone would be confined to a narrower shallower area of the creek. Limestone riprap is basically inert and also would not itself contribute much silt and sediment to the creek water, but its placement would cause some temporary agitation of bottom substrate, resulting in some turbidity that would dissipate downstream. As previously mentioned in paragraph 2.5, some concrete elutriate might seep through the fabric form lining before the grout hardens, but would be quickly dissipated downstream by the creeks rapidly flowing water. Placement of grout would take about 1-3 months to complete - depending on number of employees and number of pumps used to accomplish this task. Earth fill would be placed in the dry abandoned section of Tributary #9 for a length of about 60-80 feet, and behind the steel sheet piling of the water control structure (prior to placement of earth fill behind the sheet piling, water would be pumped out). A small amount of earth fill may fall into water of the main stream, but is not expected to cause a measureable difference in turbidity.

2.6.1 With regard to Water Quality Certification, as stated in the New York State Department of Environmental Conservation (NYSDEC) letter dated 6 August 1979 (on file at the Buffalo District Office) whenever NYSDEC is a local cooperator on flood control projects, they waive the necessity for requiring a Section 401 Water Quality Permit. NYSDEC is a local cooperator on this proposed project; therefore, a Water Quality Certificate would not be required. The New York State Water Quality Classification - based on best use - for Limestone Creek is C(t). Class C waters are suitable for fishing and any other uses except primary contact recreation and as a source of water supply for drinking, culinary, or food processing purposes. The symbol (t) means that these waters are trout waters and the dissolved oxygen specification of not less than 5.0 ppm applies.

2.7 Determination of Cumulative Effects on the Aquatic Ecosystem. It is estimated that placement of fill material into the creek would take about two construction periods to complete; therefore, the aforementioned impacts described in paragraphs 2.1 through 2.6 could be experienced over two late summer and fall periods. Some minor repair of fill placed into the creek may be required, as needed, to maintain the project. If such repair was required, similar type fill would be used. With regard to stone riprap, its purpose is to prevent and minimize bank erosion (which now occurs naturally to some degree) along the creek. Placement of riprap fill would probably not lead to a proliferation of similar type stone fill along other areas of the creek. However, if the need for such action did occur at some time in the future, the net cumulative impact would be on further long-term loss of some existing riparian wildlife food, cover, and nesting habitat, and further loss of some existing aquatic habitat along the creek banks in that area within the ordinary high water line of the creek. Such existing habitat would be replaced with quarry stone that would further decrease the existing type of natural soil and stone substrate along the creek. Similar cumulative habitat loss would occur if more concrete was ever placed into the creek in areas downstream of the proposed project.

2.8 Determinations of Secondary Effects on the Aquatic Ecosystem. Bank soil stabilization by riprap stone (and on bank slopes where cement grout is placed) will contribute toward some degree of silt and sediment turbidity

decrease in the creek. Also, when not covered with water, crevices among riprap stones will provide habitat harborage for small rodents (i.e. wild mice) that are normally used as food by predators such as foxes, hawks, and owls. However, elimination of vegetation variety where riprap and concrete grout is placed would decrease existing tree, shrub, and grass/forb habitat that is utilized by birds. Some natural terrestrial vegetation will probably eventually establish among riprap stones as crevices fill with wind blown and water deposited soil and seeds. Quarry stone riprap placed below the ordinary high water line in the creek would provide a new type of stone habitat for utilization by benthic invertebrates and fish - particularly along the "toe" zone of such riprap that is always (or most often) covered with water at the bottom of the bank slope.

3. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

3.1 Adaptation of the Section 404(b)(1) Guidelines to this Evaluation. No significant adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

3.2 Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem. In addition to the selected Plan 3 - Channelization with Fabric Formed Conrete Erosion Protection - two other feasible alternative plans were considered. These alternative plans are addressed in Sections 2 and 4 of the Environmental Impact Statement. Briefly, Plan 1 - No Action - means that no project would be constructed if the Federal Government could not justify Federal construction in addressing flooding problems at Manlius. Although Plan 1 would not cause structural impacts on the creek, this plan was not selected since it would not provide flood control to the community. Plan 2 - Relocation of Production Products, Incorporated - would have involved relocation within the community of an important manufacturing business. Although Plan 2 would not have involved placement of fill into Limestone Creek, it is not feasible, and basically, only one entity - although important to the community - would benefit. After taking into consideration such factors as high water velo-cities in the creek, cost, existing technology, and logistics in light of overall project purposes, Plan 3 was determined to be the most practicable alternative, and has been selected based on its performance in addressing community needs and its overall contribution to the goals of National Economic Development and social acceptability. Even though fill associated with implementation of Plan 3 has the most adverse impact on the biological community of the creek of the feasible plans considered, with appropriate mitigation measures, this plan is made more environmentally acceptable.

3.3 Compliance With Applicable State Water Quality Standards and Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act. The planned placement of fill material into Limestone Creek would not violate any applicable State water quality standards with the exception of turbidity. Creek pH would be closely monitored to insure it remains within acceptable limits during the grouting procedure. The disposal operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

3.4 Compliance With the Endangered Species Act of 1973. Placement of fill material into Limestone Creek will not harm any endangered species or their critical habitat.

3.5 Evaluation of Extent of Degradation of the Waters of the United States. Placement of fill into Limestone Creek will not result in significant adverse effects on human health and welfare, municipal and private water supplies, plankton and commercial fishing. Recreation fishing in the project vicinity could be temporarily disrupted, due to water turbidity caused by construction during the July through September trout season period. The quality of fishing would be decreased to some degree in the creek area that would be covered by concrete because existing aquatic habitat diversity that contributes to food and cover for fish would be reduced by elimination of existing riffles and pools and bottom substrate, in order to install the covering of fabric formed concrete, as well as placement of riprap and earth fill where required.

3.5.1 A small section of existing Tributary #9 (considered to be a special aquatic site used by brown trout for spawning and nursery purposes) would be lost. About 60-80 linear feet of this very narrow shallow tributary (from its junction with the main branch of Limestone Creek, upstream) would be filled, but would be replaced by excavating a new portion of tributary "in-the-dry" beside it, that would be about 450 feet long. This new tributary portion would slightly rerout flow from Tributary #9 back into the more natural creek channel below the proposed water control structure. The new tributary portion would be designed to have approximately the same bottom width, slope gradient, and bottom substrate as the original tributary portion that was filled, to allow for continued trout access and spawning in the future.

3.5.2 The life stages of aquatic life and wildlife (as well as any wildlife dependent on aquatic ecosystems) would not be significantly affected, except that brown trout spawning could be temporarily disrupted in Tributary #9 if construction extends into the fall brown trout spawning period. On the immediate stream area where fill is placed, there would be a significant adverse affect on some components of aquatic ecosystem diversity, productivity and stability in that: (1) existing habitat would be covered over with a new type of substrate; (2) riparian vegetation would be removed and expose the creek to more direct sunlight and potentially raise water temperature to some extent; (3) although there are other trout spawning and nursery tributaries into the main branch of Limestone Creek, use of Tributary #9 by brown trout for spawning could either be temporarily curtailed or reduced during construction; (4) riprap, earth and cement fill would cover over existing benthic organisms and some small forage fish (i.e. sculpins) that live on and among the stony aquatic bottom substrate, thereby reducing creek productivity to some degree. Recolonization by aquatic organisms would probably be significantly less and occur less rapidly on the fabric formal concrete lined section of creek, since habitat diversity - especially cover - to support such life would be much reduced.

3.5.3 As mentioned previously, there could be some temporary significant effect on recreation fishing value in the project zone, as well as on aesthetic value. Where riprap and fabric formed concrete lining are placed, the

creek would have a man-made appearance for the life of the project. However, no significant adverse effect on economic value of the creek is anticipated.

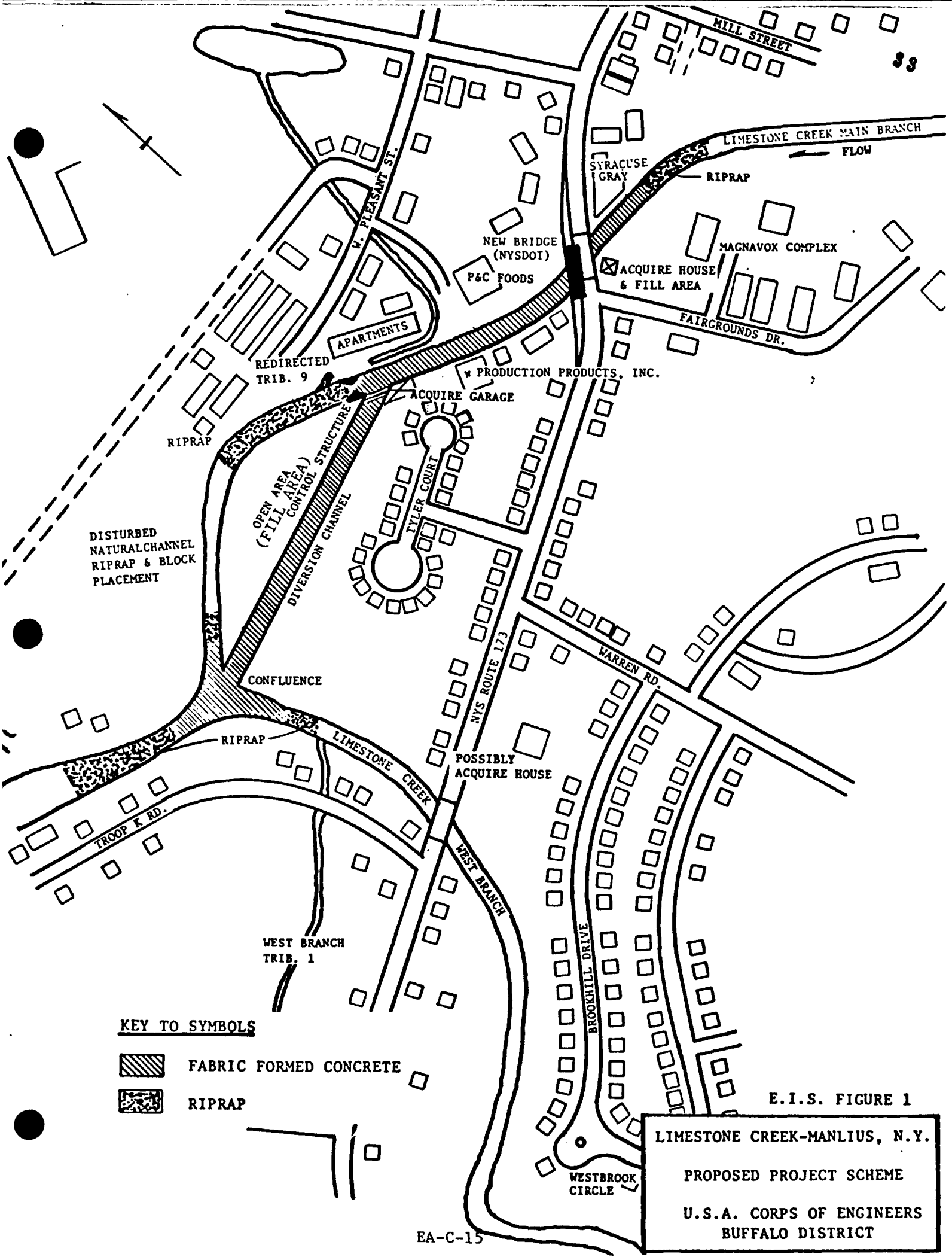
3.6 Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem. Appropriate steps to minimize potential adverse impacts of the discharge of fill on the aquatic system include: (1) scheduling construction operations as much as possible during low-flow periods, (2) installation of precast concrete blocks as fish habitat mitigation where specified by NYSDEC, (3) precautionary measures to minimize the chance for accidental spillage of cement grout into the creek, and (4) installation of gravelly substrate fill "in-the-dry" into the new section of Tributary #9, in order to minimize adverse impacts on the aquatic fish and wildlife population associated with Limestone Creek. Also, the Corps of Engineers Civil Works Construction Guide Specification entitled "Environmental Protection" (CW-0143 July 1978) would be followed to help minimize adverse impacts on the aquatic ecosystem. A Contractor doing the project work would be required to keep construction activities under surveillance; monitoring management and control in order to avoid pollution of water resources, and to minimize disturbance and damage fish and wildlife.

3.7 On the Basis of the Guidelines, the Proposed Disposal Site for the Discharge of Dredged or Fill Material is: Specified as complying with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.

Daniel R. Clark

DANIEL R. CLARK
Colonel, Corps of Engineers
District Commander

Date: 3 Dec 1985



E.I.S. FIGURE 1

LIMESTONE CREEK-MANLIUS, N.Y.

PROPOSED PROJECT SCHEME

U.S.A. CORPS OF ENGINEERS
BUFFALO DISTRICT

LIMESTONE CREEK - SECTION 205
AT MANLIUS, NEW YORK

ENV. APPEN. D - CULTURAL RESOURCES COMPLIANCE

U.S. Army Corps of Engineers
Buffalo District

TELEPHONE OR VERBAL CONVERSATION RECORD

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office.

DATE: 10 Dec. 86

SUBJECT OF CONVERSATION: Limestone Creek at Manlius - Rte 173 Bridge Relocation

INCOMING CALL

PERSON CALLING	ADDRESS	PHONE NUMBER AND EXTENSION

PERSON CALLED	OFFICE	PHONE NUMBER AND EXTENSION

OUTGOING CALL

PERSON CALLING	OFFICE	PHONE NUMBER AND EXTENSION
Tod Smith	NCBPD-ER	Ext. R173

PERSON CALLED	ADDRESS	PHONE NUMBER AND EXTENSION
Joe Flint	NYSDOT - Syracuse	8(315)428-4409

SUMMARY OF CONVERSATION

I inquired if NYSDOT had done any further studies into relocation of the Route 173 bridge at Manlius, N.Y.; particularly those associated with environmental and cultural resource impacts. We will need to coordinate further on their bridge replacement and our flood control project.

Mr. Flint indicated that not much more work has been done, but that since substantial Federal funding for bridge replacement would be expected for the project; associated environmental and cultural resource studies would be necessary. Information would be coordinated with the Corps, but Mr. Flint indicated that these studies are not expected to occur for some time.

I indicated that our FDPR and FEIS were scheduled for submission to our division office by the end of December and would likely be coordinated with the public and his office in February or March. I also indicated that I would send him a copy of our cultural resources study report for their reference.

OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION
NEW YORK STATE
Orin Lehman
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
The Governor Nelson A. Rockefeller Empire State Plaza
Agency Building 1, Albany, New York 12238
518-474-0456

October 17, 1985

Mr. Charles E. Gilbert
Chief, Planning Division
Buffalo District Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207

Dear Mr. Gilbert:

Re: Limestone Creek Flood Control Project
Manlius, Onondaga County (Corps)

The State Historic Preservation Officer (SHPO) has reviewed the above project in accordance with the Advisory Council on Historic Preservation's regulations, "Protection of Historic and Cultural Properties," 36 CFR 800.

In the opinion of the SHPO the 1920 concrete arch bridge (BIN 1039210) and the structure designated LC/06 do not meet the National Register criteria.

The SHPO will provide comments on the proposed diversion channel after we have received and reviewed the supplemental cultural resources study being initiated by your office.

The relocation of the 1920 concrete arch bridge represents an aspect of the project not previously reviewed by the SHPO. Given the findings of the reconnaissance survey, the SHPO recommends additional archaeological investigation within the proposed impact area of the bridge relocation.

If you have any questions, please contact the project review staff at 518:474-3176.

Sincerely,

Julia S. Stokes
Deputy Commissioner for
Historic Preservation

bb

NCBPD-ER

09 SEP 1985

SUBJECT: Limestone Creek - Section 205 Flood Control Project at Manlius, NY - Cultural Resources.

Mr. Stephen J. Raiche, Director
Historic Preservation Field Services
Division for Historic Preservation
New York State Office of Parks
Recreation and Historic Preservation
Agency Building 1, Empire State Plaza
Albany, NY 12238

OFC. MGMT. OAS
3SEP85 13 382

Dear Mr. Raiche:

This letter is in reference to the Section 205 Flood Control Study for Limestone Creek at Manlius NY. In compliance with Section 106 of the National Historic Preservation Act and Executive Order 11593, I wish to continue coordination between our respective agencies regarding this proposed project.

A Cultural Resources Reconnaissance Study was performed for the project site in the summer of 1982. A copy of the resulting report entitled, "Cultural Reconnaissance Study for the Limestone Creek Flood Control Project, Manlius NY (Pratt 1982)" was forwarded to your office in August 1982 for review. The Conclusions and Recommendations Section of this report by Pratt (Page 51) stated that no sites within the project area are currently on the National Register of Historic Places (NRHP), and no such properties have been nominated. Several sites however, were identified in this section as being potential historically significant cultural resources: also recommendations were made relative to additional cultural resources work if the project were to impact these resources.

A letter from the Corps of Engineers, Buffalo District to your office dated 14 August 1983 provided a finalized project scheme and description, but did not specifically identify those sites identified in the Pratt Cultural Resources Reconnaissance Study as being of some historical significance that would be affected.

NCBED-ER
SUBJECT: Limestone Creek - Section 205 Flood Control Project at Manlius, NY - Cultural Resources.

Small portions of mill raceways close to the creek which were identified in the Pratt report would likely be disrupted to some degree by project implementation - reference Page 51 and Figure 8 - Study Area. Two structures identified as posible cultural resources of some historical potential would also be impacted by project implementation: the house identified in the Pratt report as LC/06, and the 1920 Route 173 bridge which spans the main branch of Limestone Creek. The house is identified as having some potential historical value as a remnant of the area's history of development. Reference (Pratt 1982), Pages 39, 43, 107, and 109. The bridge is identified as a concrete arch bridge (BIN 1039210) built in 1920 (NYSDOT) which may be of some significance. Reference Pratt report Pages 41, 42, and 51. New photographs of these structures will be submitted under seperate letter.

Building-Structure Inventory Forms and Photo Documentation Sheets for Architectural Assessment were prepared and included in the Pratt 1982 report for structures in the project area considered to be of some significant historical potential. Only a photograph of the house LC/06 was included as a structure of some historical potential. See Attachment. No photograph of the Route 173, 1920 bridge was included.

With project implementation, it is proposed that the house (LC/06) be acquired and demolished, and the area backfilled. The 1920 bridge would be demolished and a new bridge constructed in its place by the New York State Department of Transportation.

I request your opinion, recommendation, and/or determination as to whether or not these structures are eligible for and/or should be placed on the National Register of Historic Places and; if eligible, of what significance project impacts would be relative to these structures and cultural resources. Please respond by 13 September 1985.

Note additionally, that a supplemental cultural resources study is being initiated by my office to specifically examine the area that would be disturbed by the project diversion channel; its findings will be coordinated with your office.

Correspondence pertaining to this matter should be addressed to the District Commander, U.S. Army Engineer District, Buffalo, 1776 Niagara Street, Buffalo, NY 14207, ATTN: Mr. James Bennett. If you have any questions or

b/2173
8/30/85 89

NCBPD-ER
SUBJECT: Limestone Creek - Section 205 Flood Control Project at Manlius, NY - Cultural Resources.

require additional information, please contact Mr. Bennett of my Environmental Analysis Branch at (716) 876-5454, extension 2180.

The Buffalo District -- Leadership in Engineering.

Sincerely,

[illegible] Cabell, LTC
Deputy District Commander

DANIEL P. CLARK
Colonel, Corps of Engineers
District Commander

Enclosures
as stated

Copy Furnished:
✓NCBPD-ER
NCBPD-S
NCBPD

Concur:
NCBPD-S 8/30

Smith/Bryniarski
Bennett
Zorich
Cabell
Clark

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE
Orin Lehman
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
The Governor Nelson A. Rockefeller Empire State Plaza
Agency Building 1 Albany, New York 12238
518-474-0456

41

September 22, 1983

Colonel Robert Hardiman
District Engineer
U.S. Army Engineer District, Buffalo
Attn: NCBPD-ER/Daly
1776 Niagara St.
Buffalo, NY 14207

Dear Col. Hardiman:

Limestone Creek
Manlius, Onondaga County

The State Historic Preservation Officer (SHPO) has reviewed the above project in accordance with the Advisory Council on Historic Preservation's regulations, "Protection of Historic and Cultural Properties," 36 CFR 800.

Based upon this review, it is the opinion of the SHPO that this project will have no effect upon cultural resources included in or eligible for inclusion in the National Register of Historic Places.

Should you have any questions, please contact the project review staff at 518-474-3176.

Sincerely,

Albert E. Caccese
Albert E. Caccese
Deputy Commissioner and Counsel

BF:mr

#1
11/82

17 AUG 1983

NCBPD-ER

SUBJECT: Limestone Creek, Manlius, NY - Cultural Resources

Mr. Stephen J. Kaiche, Director
Historic Preservation Field Services
Division for Historic Preservation
New York State Office of Parks
and Recreation
Agency Building 1, Empire State
Plaza
Albany, NY 12238

Dear Mr. Kaiche:

The U.S. Army Corps of Engineers, Buffalo District, has modified its final design plans to provide flood control at Limestone Creek, Manlius, NY.

A cultural resources reconnaissance study was performed for this project in the summer of 1982 and a copy of the resulting report, entitled Cultural Reconnaissance Study for the Limestone Creek Flood Control Project, Manlius, New York, was forwarded to your office in August 1982 for your review.

In compliance with Section 106 of the National Historic Preservation Act and Executive Order 11593, I wish to reestablish coordination between our respective agencies regarding this final engineering design.

Please review this final design plan, attached here as Enclosure 1, in light of the above-referenced cultural resources report and provide me with your comments and recommendations by 12 September 1983. This information should be sent to the following address:

16

District Engineer
U.S. Army Engineer District, Buffalo
ATTN: NCBPD-ER/Daly
1776 Niagara Street
Buffalo, NY 14207

JW-8175
8/10/83

44

NCBPD-ER
SUBJECT: Lit[illegible]one Creek, Manlius, NY - Cultural Resources

The point of contact for this action is Mr. Timothy Daly, telephone (716) 876-5454, extension 2175, (FTS 473-2175), of the District's Planning Division.

Sincerely,

SIGNED

ROBERT R. HARDIMAN
Colonel, Corps of Engineers
District Engineer

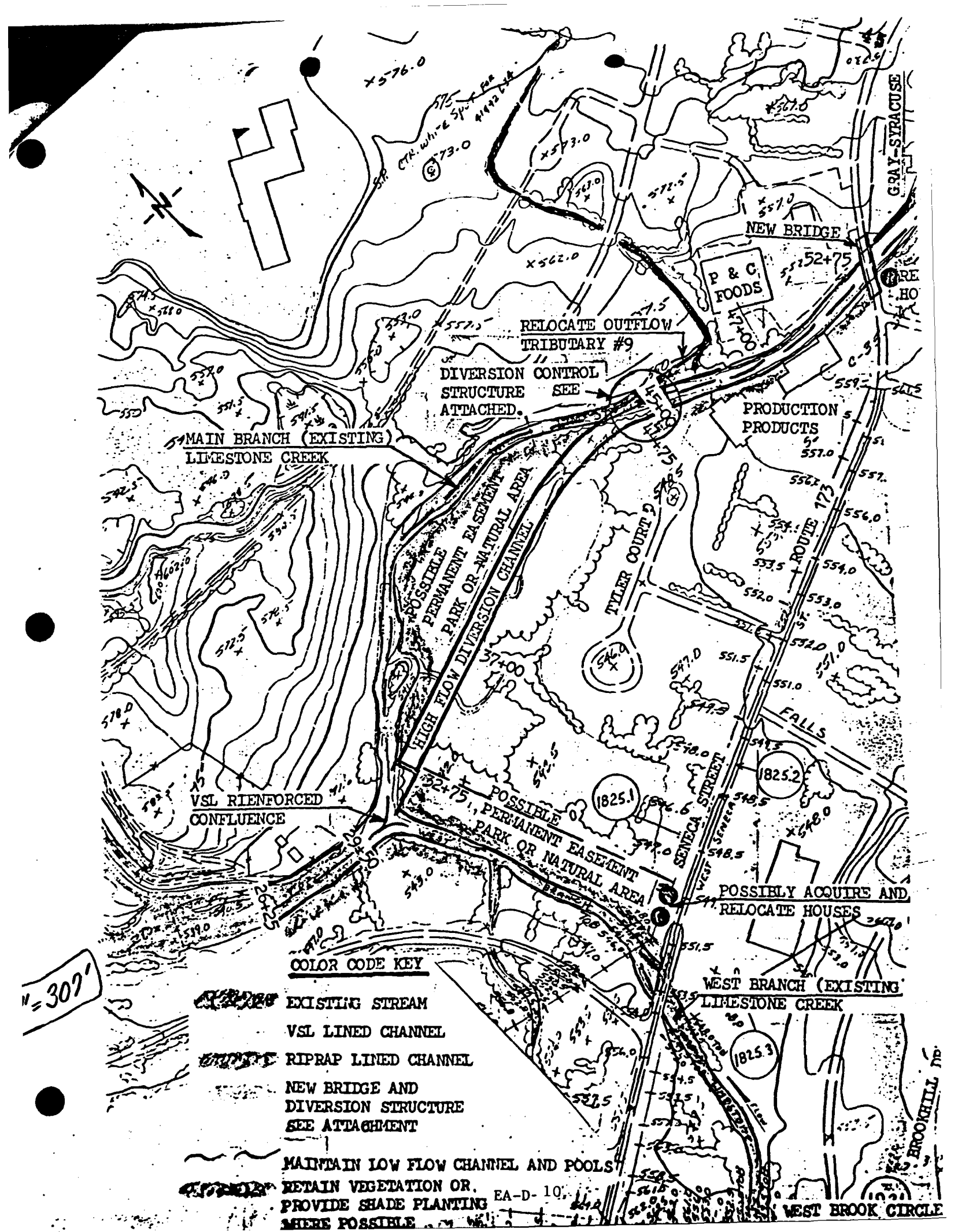
1 Enclosure
as stated

Copies Furnished:

✓NCBPD-ER
NCBED-SS

Daly 8/11
T. Smith
Bryniarski
Bennett
Werick 8/15
Montvai
Pieczynski
Knott/ 8/15
Hallock
Gilbert/
Liddell
Creeden 8/16
Hardiman

17 AUG 83 08 39
OFC. MGMT. DAS


NEW BRIDGE
52+75
P & C FOODS
RELOCATE OUTFLOW TRIBUTARY #9
DIVERSION CONTROL STRUCTURE SEE ATTACHED.
PRODUCTION PRODUCTS
MAIN BRANCH (EXISTING) LIMESTONE CREEK
POSSIBLE PERMANENT EASEMENT PARK OR NATURAL AREA
HIGH FLOW DIVERSION CHANNEL
TYLER COURT
ROUTE 173
37+00
FALLS
VSL RIENFORCED CONFLUENCE
32+75
POSSIBLE PERMANENT EASEMENT PARK OR NATURAL AREA
SENECA STREET
POSSIBLY ACQUIRE AND RELOCATE HOUSES
WEST BRANCH (EXISTING) LIMESTONE CREEK
1825.1
1825.2
1825.3
GRAY-SYRACUSE
WEST BROOK CIRCLE
COLOR CODE KEY
EXISTING STREAM
VSL LINED CHANNEL
RIPRAP LINED CHANNEL
NEW BRIDGE AND DIVERSION STRUCTURE SEE ATTACHMENT
MAINTAIN LOW FLOW CHANNEL AND POOLS
RETAIN VEGETATION OR. PROVIDE SHADE PLANTING WHERE POSSIBLE
N = 302'

47

17 AUG 1983

...Creek, Manlius, NY - Cultural Resources

...point of contact for ... is Mr. ..., telephone ..., of the District's Planning ... NCBPD-ER.

SUBJECT: Limestone Creek, Manlius, NY - Cultural Resources

Ms. Myra F. Harrison
Assistant Regional Director
Office of Cultural Programs
U.S. Department of the Interior
National Park Service
Mid-Atlantic Region
143 South Third Street
Philadelphia, PA 19106

Dear Ms. Harrison:

The U.S. Army Corps of Engineers, Buffalo District, has modified its final design plans to provide flood control at Limestone Creek, Manlius, NY.

A cultural resources reconnaissance study was performed for this project in the summer of 1982 and a copy of the resulting report, entitled Cultural Reconnaissance Study for the Limestone Creek Flood Control Project, Manlius, New York, was forwarded to your office in August 1982 for your review.

In compliance with Section 106 of the National Historic Preservation Act and Executive Order 11593, I wish to reestablish coordination between our respective agencies regarding this final engineering design.

Please review this final design plan, attached here as Enclosure 1, in light of the above-referenced cultural resources report and provide me with your comments and recommendations by 12 September 1983. This information should be sent to the following address:

District Engineer
U.S. Army Engineer District, Buffalo
ATTN: NCBPD-ER/Daly
1776 Niagara Street
Buffalo, NY 14207

NCBPD-ER
SUBJECT: Limestone Creek, Manlius, NY - Cultural Resources

The point of contact for this action is Mr. Timothy Daly, telephone (716) 876-5454, extension 2175, (FTS 473-2175), of the District's Planning Division.

Sincerely,

SIGNED

ROBERT K. HARDIMAN
Colonel, Corps of Engineers
District Engineer

1 Enclosure
as stated

Copies Furnished:

✓NCBPD-ER
NCBED-SS

Daly 8/11
T. Smith 8/15
Bryniarski 8/15
Bennett
Werick 8/15
Montvai 8/15
Pieczynski 8/15
Knott/ 8/15
Hallock
Gilbert/
Liddell
Creeden
Hardiman

OFC. MGMT, OAS
17 AUG 81 08 35

49

4/2175

NCBPD-ER

24 June 1982

Dear:

Enclosed for your information is a final cultural resources report entitled Cultural Resources Reconnaissance Study for the Limestone Creek Flood Control Project, Manlius, New York.

If you have any questions, please contact Mr. Tim Daly at (716) 876-5454, extension 2175.

Sincerely,

1 Incl
as stated

CHARLES E. GILBERT
Chief, Planning Division

Stephen J. Raiche, Director
Historic Preservation Field Services
Division for Historic Preservation
New York State Office of Parks
and Recreation
Empire State Plaza, Agency Building 1
Albany, NY 12238

Dr. Robert E. Funk, State Archaeologist
New York State Museum and Science Service
Anthropological Survey
Albany, NY 12234

Ms. Myra F. Harrison
Assistant Regional Director
Office of Cultural Programs
U.S. Department of the Interior
National Park Service
Mid-Atlantic Region
143 South Third Street
Philadelphia, PA 19106

Dr. Bennie Keel, Chief
Interagency Archaeological Service
Office of Archaeology and Historic
Preservation
U.S. Department of the Interior
Washington, DC 20240

Robert Garvey, Executive Director
Advisory Council on Historic Preservation
1522 K Street NW
Washington, DC 20240

Keeper of the National Register
National Register of Historic Places
Office of Archaeology and Historic
Preservation
U.S. Department of the Interior
Washington, DC 20240

CDR, USACE (DAEN-ASI-L)
WASH DC 20314

CDR, USACE (DAEN-ASH)
WASH DC 20314

jeg/2273

NCBSP
DACW49-81-C-0065

Marjorie K. Pratt, President
Pratt and Pratt Archaeological
Consultants, Inc.
1220 Euclid Avenue
Syracuse, NY 31210

Dear Ms. Pratt:

The work which you have performed under this contract was examined and found to be completed in accordance with the contract specifications.

As Contracting Officer, I hereby accept the entire work on behalf of the United States as satisfactory.

Sincerely,

GEORGE P. JOHNSON
Colonel, Corps of Engineers
Contracting Officer

CF:
NCBPD
NCBPD-SS
NCBPD-ER
NCBOC
NCBDC (signed)

PROJ MGR_____
C.O.R._____
MADORE_____
COUNSEL_____
C.O._____

V1

CONCLUSIONS AND RECOMMENDATIONS

1. National Register Properties

No sites within the project area are currently on the National Register of Historic Places, and no such properties have been nominated (National Register 1979, 1981; N.Y.S. Office of Parks and Recreation 1980; LaFrank 1982). The closest National Register properties lie in the Manlius Village Historic District which is located, at the closest point, approximately 600 feet to the northeast of the northern boundary of the study area.

2. Potentially Significant Cultural Resources

Based upon the literature search the potential for locating prehistoric, proto-historic and historic Indian sites within the project area is low to moderate. While numerous sites occur in the region surrounding the study area, and the natural resources necessary to maintain a prehistoric population occur within the study area, the amount of 19th and 20th century disturbance limits the probability of finding significant prehistoric, proto-historic and historic Indian sites.

Based upon the literature search the potential for locating historic non-Indian sites is high. A brief summary of potential sites follows. A more detailed discussion of these sites will be found in the BACKGROUND AND LITERATURE SEARCH. The location of these sites will be found on Figure 8 (page 31). The Great Genesee Road ran through the study area and followed the route of present N.Y.S. Route 173. This early turnpike is shown on maps of the 1790's. An 18th century mill site may be located behind the present Gray-Syracuse Inc. structures. This mill complex and dam may have been washed out in the heavy rains of 1809. The Red Mill-Stone Machinery Company Complex was located outside the study area but the discharge of water from this complex occurred within the project area. This discharge presently can be seen as a rubble stone arched culvert. The Paper Mill-Stone Complex is outside the project area, but the raceways and mill pond relating to the complex are in the project area. The Cheney Complex, represented in part by the present Gray, Syracuse, Inc., occurs within and immediately adjacent to the study area. The Cheney Complex of structures, which were built primarily in the second half of the 19th century, occur in the areas of earlier structure. These are discussed more fully above. The Canal Feeder-Ledyard Dyke Complex begins with a dam within the project area. This area may be the location of the earlier Hall's Mills.

The 1920 concrete arch bridge over the East Branch of Limestone Creek is of some significance.

The field testing produced potentially significant artifacts in one location. Transect 4, Test Pit 36, contained 19th century materials in the vicinity of the beginning of the Canal Feeder-Ledyard Dyke Complex. These materials may relate to the earlier Hall's Mills. A stone-lined raceway was also located in this area. Additionally, visual observation located several raceways, dam remains, mill ponds, and stone walls within the study area.

The architectural assessment indicated that one structure, Schoolhouse #7, may be eligible for the National Register. Several other structures may possess local significance. These structures are discussed under ARCHITECTURAL ASSESSMENT above.

3. Recommendations

The research conducted for this survey has indicated that no sites currently on the National Register of Historic Places are located in the project area. A number of sites which are potentially significant have been identified. The information currently known about these sites is not sufficient to determine if they meet the criteria for nomination to the National Register of Historic Places. Additional study of sites which would be impacted by proposed flood control activities should be undertaken at the time when the plans for such activities have been developed in sufficient detail to determine which sites, if any, will be impacted. At the time of this study the project boundaries were determined to be a rather arbitrary 100 yards from the creek. This area included some high land areas which seem unlikely to be impacted, and excluded some low flood plain areas where impact might potentially occur.

The methodology for additional evaluation of sites which might be impacted by the proposed project would vary depending on the nature of the site. The work should be directed at preparing the documentation necessary for a National Register determination and should follow "Guidelines for Levels of Documentation" published as a supplement to 36 CFR Part 63 (Federal Register, Vol. 42, No. 183, Wednesday, September 21, 1977). Work to prepare this documentation would include additional literature search aimed at developing the history and significance of the property and field work directed at documenting the present condition of the property, the boundaries of the property, and the kind of information which might be gained from further study of the property. This field investigation should also include taking photographs of the property to illustrate its current

condition and making appropriate maps to determine the nature of the site and its boundaries.

As the plans for the flood control project develop, it is possible that areas outside the 100 yard corridor studied for this report may be impacted. Should this be the case, additional cultural evaluation of these areas would be needed.

TELEPHONE OR VERBAL CONVERSATION RECORD

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office.

DATE: 5 April 1982

SUBJECT OF CONVERSATION: Limestone Creek Cultural Resources Draft Recon Report

INCOMING CALL

PERSON CALLING	ADDRESS	PHONE NUMBER AND EXTENSION
Bruce Fullem	New York State Historic Preservation Office	FTS: 564-3176
PERSON CALLED	**OFFICE**	**PHONE NUMBER AND EXTENSION**
Tim Daly	Environmental Res. Br.	X 2175

OUTGOING CALL

PERSON CALLING	OFFICE	PHONE NUMBER AND EXTENSION
PERSON CALLED	**ADDRESS**	**PHONE NUMBER AND EXTENSION**

SUMMARY OF CONVERSATION

In lieu of sending a letter, Mr. Fullem called to inform this office of the SHPO's concurrence with the findings of the Draft Cultural Resources Reconnaissance Study for the Limestone Creek Flood Control Project, Manlius, New York (January 1982).

Mr. Fullem cautioned this office that if structures are affected in the selected plan, the SHPO's Office must receive both photographs and completed New York State Forms HP-1 for all affected structures which pre-date World War II.

CF:
Ted Smith
McDermott
Werick
Bryniarski

DA FORM 1 APR 66 751 REPLACES EDITION OF 1 FEB 58 WHICH WILL BE USED.

LIMESTONE CREEK - SECTION 205
AT MANLIUS, NEW YORK

ENV. APPEN. E - ENVIRONMENTAL MEASURES SCHEME

U.S. Army Corps of Engineers
Buffalo District

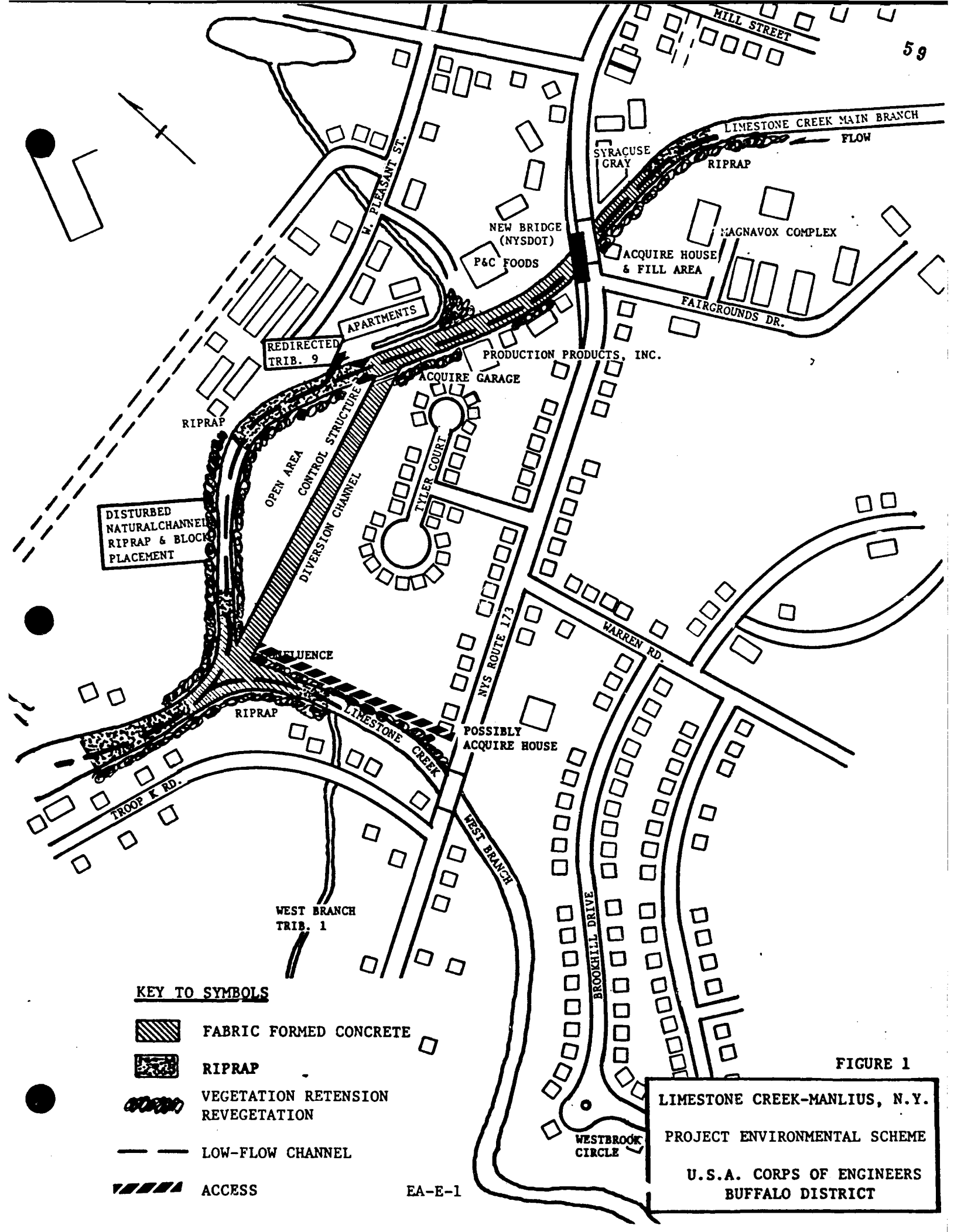
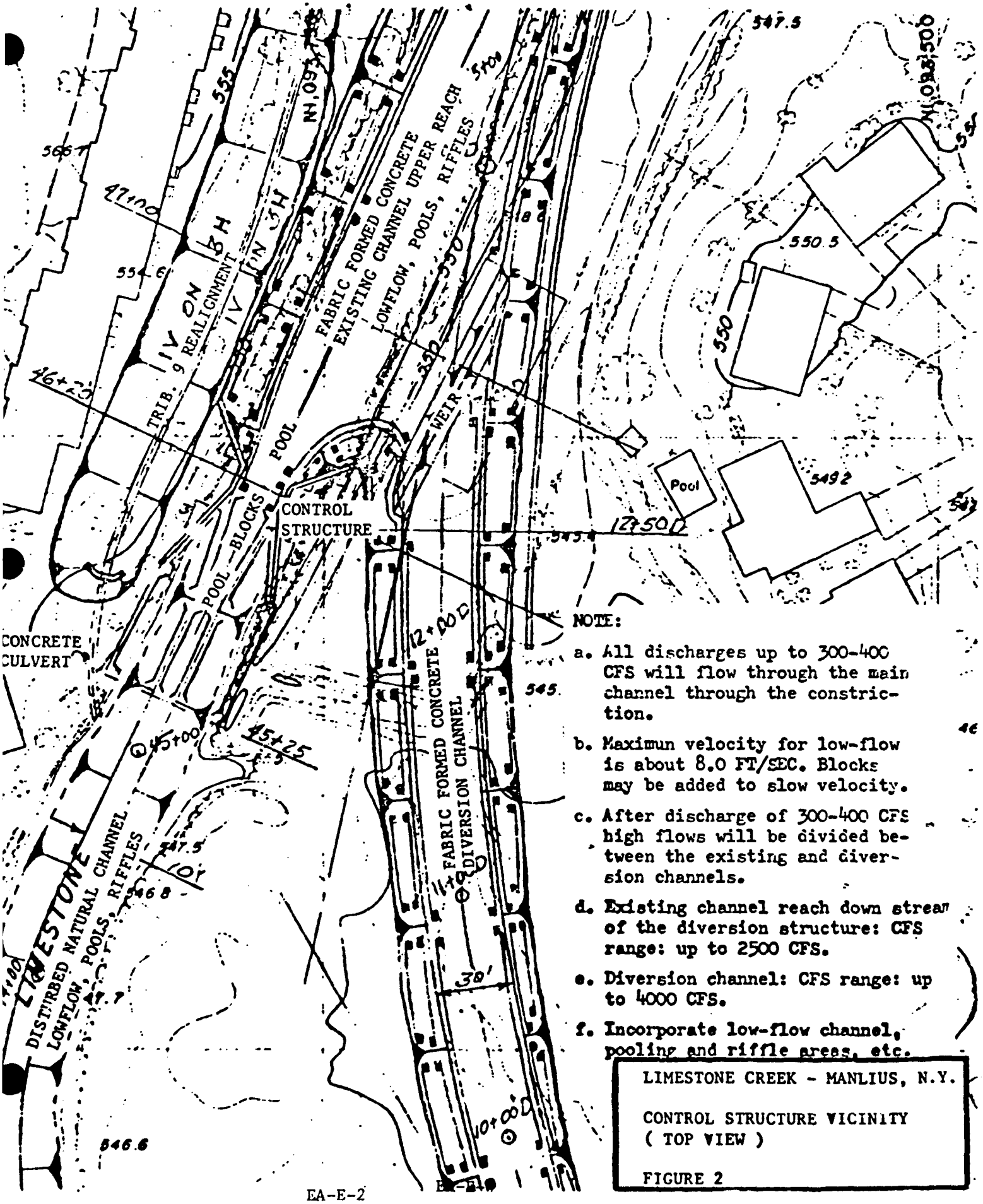


FIGURE 1

LIMESTONE CREEK-MANLIUS, N.Y.

PROJECT ENVIRONMENTAL SCHEME

U.S.A. CORPS OF ENGINEERS
BUFFALO DISTRICT



NOTE:

a. All discharges up to 300-400 CFS will flow through the main channel through the constriction.

b. Maximun velocity for low-flow is about 8.0 FT/SEC. Blocks may be added to slow velocity.

c. After discharge of 300-400 CFS high flows will be divided between the existing and diversion channels.

d. Existing channel reach down stream of the diversion structure: CFS range: up to 2500 CFS.

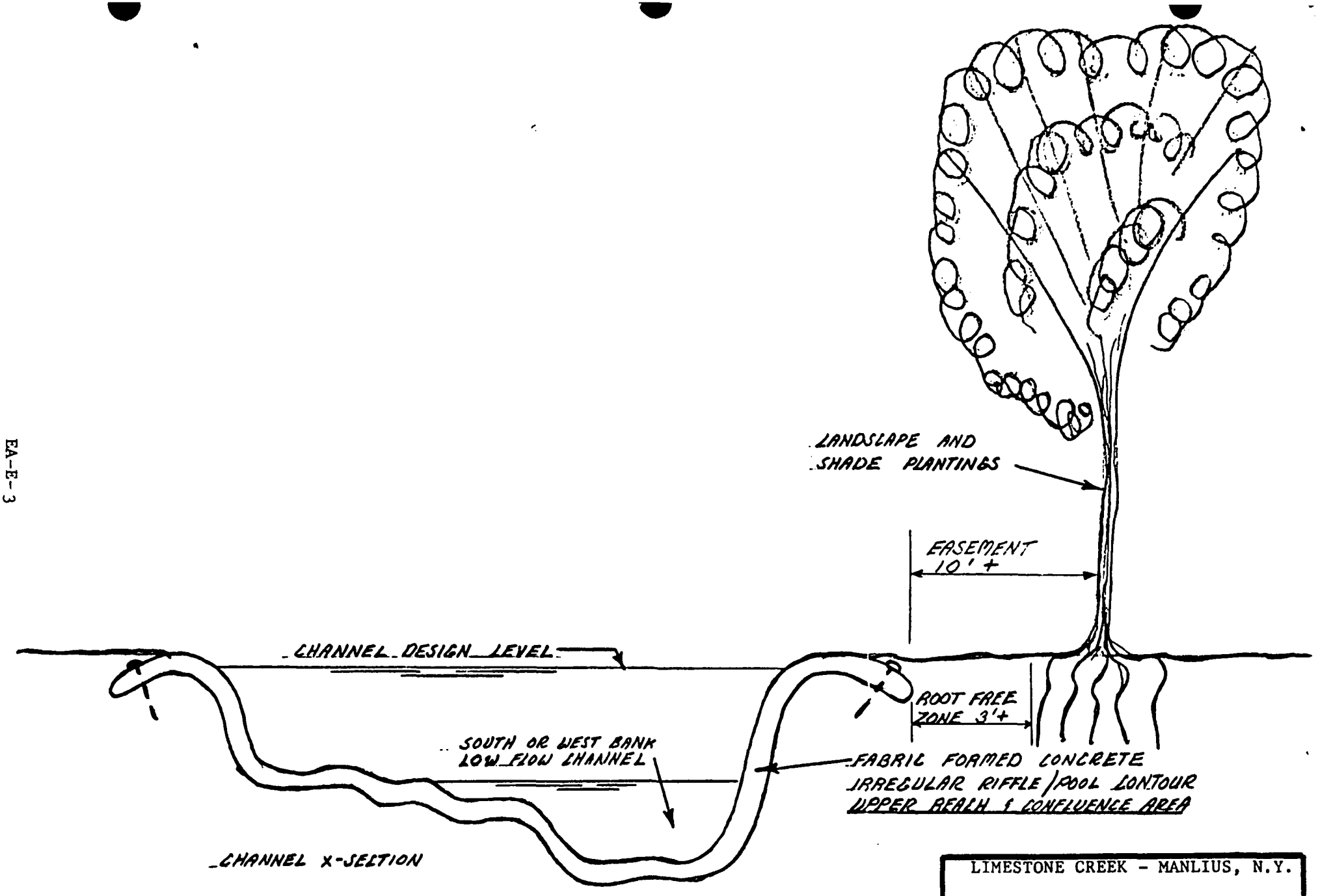
e. Diversion channel: CFS range: up to 4000 CFS.

f. Incorporate low-flow channel, pooling and riffle areas, etc.

LIMESTONE CREEK - MANLIUS, N.Y.

CONTROL STRUCTURE VICINITY
(TOP VIEW)

FIGURE 2



LIMESTONE CREEK - MANLIUS, N.Y.

LOW-FLOW AND VEGETATION SKETCH
(CROSS SECTION VIEW)

FIGURE 3

LIMESTONE CREEK - SECTION 205
AT MANLIUS, NEW YORK

ENV. APPEN. F - STANDARDIZED EROSION AND SILTATION PROTECTION MEASURES

U.S. Army Corps of Engineers
Buffalo District

ENV. APPEN. F - STANDARDIZED EROSION AND SILTATION PROTECTION MEASURES

EXTRACTED FROM: THE CIVIL WORKS CONSTRUCTION GUIDE SPECIFICATION - ENVIRONMENTAL PROTECTION (CW-01430 JULY 1978)

7.1.3 Reduction of Exposure of Unprotected Erodible Soils. Earthwork brought to final grade shall be finished as indicated and specified. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Except in instances where the constructed feature obscures borrow areas, quarries and waste material areas, these areas shall not initially be cleared in total. Clearing of such areas shall progress in reasonably sized increments as needed to use the areas developed as approved by the Contracting Officer.

7.1.4 Temporary Protection of Disturbed Areas. Such methods as necessary shall be utilized to effectively prevent erosion and control sedimentation, including but not limited to the following:

(1) Retardation and Control of Runoff. Runoff from the construction site shall be controlled by construction of diversion ditches, benches, and berms to retard and divert runoff to protected drainage courses, and any measures required by area-wide plans approved under paragraph 208 of the Clean Water Act.

(2) Sediment Basins. Sediment from construction areas shall be trapped in temporary or permanent sediment basins in accordance with basin plans shown on the drawings. The basins shall accommodate the runoff of a local *(design year) storm. After each storm the basins shall be pumped dry and accumulated sediment shall be removed as necessary to maintain basin effectiveness. Overflow shall be controlled by paved weir or by vertical overflow pipe, draining from the surface. The collected top soil sediment shall be reused for fill on the construction site, and/or conserved (stockpiled) for use at another site(s). The Contractor shall institute effluent quality monitoring programs as required by state and local environmental agencies.

NOTE: THE DESIGN YEAR STORM IS DETERMINED BY THE DOWNSTREAM ENVIRONMENT TO BE PROTECTED. ESTIMATE OF DAMAGE TO THE DOWNSTREAM ENVIRONMENT VERSUS THE DESIGN YEAR STORM THAT WILL CAUSE THIS LEVEL OF DAMAGE SHOULD BE MADE AND THE APPROPRIATE PROTECTION IMPLEMENTED. IN THE EVENT PERMANENT SEDIMENT BASINS ARE NECESSARY FOR THE PARTICULAR PROJECT, THESE PERMANENT FACILITIES SHALL BE INCLUDED IN THE PROJECT DESIGN AND THE CONTRACT DOCUMENTS; IF PERMANENT BASINS ARE NOT REQUIRED, DELETE REFERENCE THERETO.

7.1.5 Erosion and Sedimentation Control Devices. The Contractor shall construct or install all temporary and permanent erosion and sedimentation control features as indicated on the drawings. Temporary erosion and sediment control measures such as berms, dikes, drains, sedimentation basins, grassing and mulching shall be maintained until permanent drainage and erosion control facilities are completed and operative.

7.1.7 Borrow Areas on Government Property shall be managed to minimize erosion and to prevent sediment from entering nearby water courses or lakes.

7.1.8 Spoil Areas on Government Property shall be managed and controlled to limit spoil to areas designated on the drawings and prevent erosion of soil or sediment from entering nearby water courses or lakes. Spoil areas shall be developed in accordance with the grading plan indicated on the drawings.

7.1.9 Temporary Excavations and Embankments for plant and/or work areas shall be controlled to protect adjacent areas from dispoilment.

LIMESTONE CREEK - SECTION 205
AT MANLIUS, NEW YORK

ENV. APPEN. G - REFERENCES

U.S. Army Corps of Engineers
Buffalo District

ENV. APPEN. G - REFERENCES

REFERENCES

1. "Flood Damage Survey for Limestone Creek Manlius and Pompey Townships, NY;" prepared by McPhee, Smith, Rosenstein Engineers, P.E., for the U.S. Army Corps of Engineers, Buffalo District; April 1980.

2. "Onondaga County - 1995 Land Use Plan;" prepared by Syracuse - Onondaga County Planning Agency; July 1977.

3. "An Appraisal of Potential Outdoor Recreational Developments in Onondaga County, NY, 1968;" published by Onondaga County Soil and Water Conservation District, and the Cooperative Extension Association of Onondaga County, Agricultural Division.

4. "Census of Population and Housing, 1980 (Micro-Fiche);" Bureau of the Census.

5. "1980 OBERS - BEAU Regional Projections; Vol. 3 Standard Metropolitan Statistical Areas;" U.S. Department of Commerce.

6. "New York State Water Quality Management Plan, Population Projections, 15 January 1981;" New York State Department of Environmental Conservation, Division of Water.

7. "New York State Business Fact Book; 1972 and 1980 Supplements;" New York State Department of Commerce.

8. "Soil Survey of Onondaga County, NY;" U.S. Department of Agriculture, Soil Conservation Service; 19

9. "Onondaga County, NY - Prime Farmland Mapping Units, 1981;" Soil Conservation Service.

10. "Onondaga County, Fresh Water Wetlands - Map;" Onondaga County, Environmental Management Council; 1977.

11. "Basic Statistics for Counties and Metropolitan Areas of New York State;" New York State Department of Commerce, 1973.

12. "Today's Environment - Tomorrow's Hopes;" produced by the Town - Village Environmental Council; 1981.

13. "Section 205 Reconnaissance Report on Flooding of West Branch of Limestone Creek, Manlius, NY;" Corps of Engineers, Buffalo District; July 1977.

14. "Summary of Environmental Considerations, Limestone Creek Watershed, Manlius, NY;" Corps of Engineers, Buffalo District - Environmental Resources Branch; September 1981, (Planning Aid Document).

15. "USGS Quad Maps."

16. "County, Town, and Village - Land Use and Zoning Maps."

17. "Limestone Creek, Manlius Township, NY; Flood Plain Information Report;" U.S. Army Corps of Engineers, Buffalo District; December 1970.

18. "Technical Proposal - Cultural Resources Reconnaissance Survey of the Limestone Creek Flood Control Project, Manlius, NY;" prepared by Pratt and Pratt Archaeological Consultants, Inc.; for the U.S Army Corps of Engineers, Buffalo District, February 1981.

19. "Road Map at Onondaga County, NY;" issued by the Department of Public Works, Division of Highway.

20. Reference Public Involvement and Coordination section of this report and Correspondence Appendix; particularly correspondence from the New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service.

LIMESTONE CREEK - SECTION 205
AT MANLIUS, NEW YORK

ENV. APPEN. H - COMMENT/RESPONSE APPENDIX
PUBLIC COMMENT AND CORPS' RESPONSES ON THE DRAFT DPR AND DRAFT EIS

U.S. Army Corps of Engineers
Buffalo District

COMMENT/RESPONSE APPENDIX

COMMENT RESPONSE ON THE LIMESTONE CREEK, MANLIUS, NY DRAFT DETAILED PROJECT REPORT AND DRAFT ENVIRONMENTAL IMPACT STATEMENT.

U.S. Department of Housing and Urban Development
Buffalo Office, Region II
107 Delaware Ave., Statler Bldg
Buffalo, New York 14202-2986

June 17, 1985

19 JUN 85 10 45 OFC. MGMT. OAS

District Commander
Attn: Mr. Bill Werick
U. S. Army Engineer District,
Buffalo
1776 Niagara Street
Buffalo, N. Y. 14207

Dear Mr. Werick:

SUBJECT: Detailed Project Report & Environmental Impact Statement
Section 205 Flood Control Study
Limestone Creek at Manlius
Onondaga County, New York

EA-H-2

We have reviewed the above captioned document and wish to offer the following comment:

1 The preferred plan indicates that the existing bridge which carries Route 173 over Limestone Creek will be replaced with a new structure. The new bridge will be raised to a higher elevation in order to allow for passage of increased water flow and elimination of debris accumulation during high flow periods. The DEIS does not include a discussion of the temporary impacts and mitigative measures associated with this component of the flood control project. The discussion might have touched upon such items as planning of traffic detours, nature of existing traffic patterns, etc

Thank you for the opportunity to comment on this Detailed Project Report and Draft Environmental Impact Statement.

Sincerely,

Joseph R. Lynch
Manager, 2 2S

cc: George Karas
Marvin Krotenberg

U.S. Department of Housing and Urban Development Buffalo Office - Region II

Comments:
17 June 1985

1. The EIS was modified to address the comment in further detail. Details of the bridge construction however, will ultimitely be determined and accomplished by the NYS Department of Transportation. Reference NYSDOT 19 July 1985 comment letter and response. Appropriate documentation will be prepared and coordinated by NYSDOT. The general plan is to build a new bridge just west of the existing bridge and to utilize the existing bridge for traffic until the new bridge can be opened; afterwhich the existing bridge would then be removed. Any adverse impacts should be minor.

7205

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
100 Grange Place
Room 202
Cortland, New York 13045

July 5, 1985

Colonel Daniel R. Clark
District Engineer, Buffalo District
U. S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Tod Smith

Dear Colonel Clark:

The U. S. Fish and Wildlife Service has reviewed the Public Notice concerning the Limestone Creek Flood Damage Reduction Project dated June 7, 1985. In it you propose to place approximately 3,000 cubic yards of limestone riprap; 2,550 cubic yards of bedding stone; 5,700 cubic yards of fabric-formed concrete; 100 linear feet of steel sheet pile (water control structure); 400 cubic yards of clean earthen fill; several hundred cubic yards of precast concrete block; and about 350 cubic yards of concrete (piers associated with construction of new Route 173 bridge) in the channel of Limestone Creek at Manlius, Onondaga County, New York. The purpose of the proposal works is to reduce flood damage caused by Limestone Creek when it overtops its banks.

This constitutes the report of the Service and the Department of the Interior on the application submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

The Service does not oppose the proposed works provided the following modifications are included:

1. The "careful monitoring of pH values" is conditioned such that the range 6.5 to 8.5 is not exceeded unless natural occurring pH values can be shown to fall outside this range. Further, should this range be exceeded, pumping of the concrete grout would cease or the pumping rate slowed such that the pH remains within the above range.

2. The pumping of the concrete grout into the liner is begun at the downstream limit and proceeds from there upstream.

3. The liner is layed in such fashion that pools, or an approximation thereof, are formed at several points throughout the reach upstream of the control structure.

1

2

EA-H-3

U.S. Department of the Interior
Fish and Wildlife Service

Comments:
5 July 1985

1. Thank you for your review and comments.

2. Concur. The DPR and EIS project descriptions incorporate these recommended fishery modifications. These modifications will be incorporated into the project plans and specifications. Also reference the Environmental Considerations section in the DPR pertaining to USFWS recommendations and Corps responses.

11

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4. The liner is layed in such fashion that a continuous low flow channel is provided throughout the project reach.

These modifications are requested to minimize the obvious adverse impact to fish and wildlife resources indigenous to the project area. The recommendation regarding the range for the pH value reconfirms our letter of November 20, 1984 (enclosed). The continuous low flow channel is recommended primarily to assure that a migratory route is available to indigenous aquatic organisms during all seasons of the year. 3

We request that these comments be considered, and should they not be acceptable, arrangements be made for further communications between our offices. Please advise us of any actions taken pursuant to our recommendations or other changes in the proposed works. If you need further information, please do not hesitate to contact Michael Stoll of my staff.

Sincerely yours,

Paul B. Hamilton

Paul P. Hamilton
Field Supervisor

Enclosure

cc: NYSDEC, Albany, NY
NYSDEC, Cortland, NY
EPA, New York, NY
EPA, Chief, Marine & Wetlands Protection Branch, New York, NY

EA-H-4

m

U.S. Department of the Interior
Fish and Wildlife Service

Comments:
5 July 1985

3. Thank you for your recomendations and coordination. As previously stated, items will be incorporated into the project plans and specifications. Coordination with your office will continue as needed.

71-
DS

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D.C. 20230

OFFICE OF THE ADMINISTRATOR

July 9, 1985

District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207
Attn: Mr. Bill Werick

Dear Mr. Werick:

This is in reference to your draft environmental impact statement for the Limestone Creek, Manlius, New York Project. Enclosed are comments from the National Oceanic and Atmospheric Administration.

1

We hope our comments will assist you. Thank you for giving us an opportunity to review the document. We would appreciate receiving two copies of the final environmental impact statement.

Sincerely,

David Cottingham

David Cottingham
Office of Ecology and
Conservation Division

Enclosure

DC:lg

EA-H-5

United States Department of Commerce
National Oceanic and Atmospheric Administration
Office of the Administrator
Washington, DC 20230

Comments
8 July 1985

1. Reference the following page.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Washington, D.C. 20230

OC 7/8

July 8, 1985

N/MR2:CMS

TO: PP2 - David Cottingham

FROM: N - Paul M. Wolf

SUBJECT: DEIS 8506.01 - Limestone Creek, Manlius, New York

The subject DEIS has been reviewed within the areas of the National Ocean Service's (NOS) responsibility and expertise and in terms of the impact of the proposed action on NOS activities and projects.

Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments. For further information about these monuments, please contact Mr. John Spencer, Chief, National Geodetic Information Branch (N/CG17), or Mr. Charles Novak, Chief, Network Maintenance Section (N/CG162), at 6001 Executive Boulevard, Rockville, Maryland 20852.

EA-II- 6

1

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service
Washington, DC 20230

Comments:
8 July 1985

1. Thank you for your review and comments. The location of existing vertical and horizontal control points in the Manlius area were identified during this study. The Corps of Engineers is unaware of any monuments which would have to be moved as a result of the construction of this project. We will coordinate with National Ocean Service well before construction to assure that this is still true.

WJW

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

JUL 22 1985

Class: EC-2

Colonel Robert R. Hardiman
District Commander
U.S. Army Corps of Engineers, Buffalo
District
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Hardiman:

We have reviewed the draft environmental impact statement (EIS) and detailed project report for the Limestone Creek Flood Control Study, located at the Village of Manlius, in Onondaga County, New York. This review was conducted in accordance with section 309 of the Clean Air Act, as amended (42 U.S.C. 7609, P.L. 91-604 12(a) 84 Stat. 1709). The proposed project involves the construction of a diversion channel of approximately 1,300 feet with fabric formed concrete erosion protection, excavation in the Main Branch of Limestone Creek with the placement of riprap and concrete blocks, and reinforcement measures at the confluence of the riprap channel, the diversion channel, and the West Branch of Limestone Creek. In addition, the project would provide other streambank protection and environmental design measures to reduce flood damage along Limestone Creek, and to mitigate for potential environmental impacts to fisheries resources. Based upon our review, we offer the following comments for your consideration.

1

The U.S. Army Corps of Engineers (COE) has coordinated extensively with the U.S. Fish and Wildlife (FWS) and New York State Department of Environmental Conservation (NYSDEC) regarding potential impacts of the selected alternative to fisheries resources of Limestone Creek. The COE, FWS, and NYSDEC propose to minimize these potential impacts to this important trout stream. We concur with the recommendations proposed by FWS regarding measures to mitigate for the loss of fish habitat, including those listed on page 6 of FWS's letter of October 5, 1983.

2

In addition, we recommend that the detailed revegetation and mitigation plan include the following measures:

1. Seasonal restrictions on construction activities to avoid trout spawning and high stream flow periods.

2. Existing riparian and terrestrial vegetation should be protected during construction to the greatest extent possible, in order to reduce soil erosion and sedimentation and minimize impacts to the stream.

3

3. The existing narrow band of riparian vegetation along the north edge of the island that will be created between the natural channel and the diversion channel should be preserved.

EA-H-7

U.S. Environmental Protection
Agency - Region II

Comments:
22 July 1985

1. Thank you for your review and comments.

2. Concur. The DPR and EIS address these FWS and NYSDEC recommendations. They will be incorporated into the project plans and specifications. Reference the Environmental Considerations section in the DPR pertaining to the USF&WS recommendations and Corps response; and the Environmental Measures Scheme and Standardized Erosion and Siltation Protection Measures sections in the Environmental appendix. (NOTE: In Addendum of the Draft Report)

3.1 The EIS (page 8) and the Section 404 Evaluation Report (Para. 2.5.1) project description mention the seasonal restriction measure. The instream construction period will be restricted to noncritical spawning times. However, since this ecosystem presently contains both spring and fall spawning trout (Rainbow and Brown trout, respectively), a possibility does exist that the construction period may overlap the Brown trout (fall) spawning period. Close coordination with both the NYSDEC and the USF&WS will be maintained to monitor this potential situation.

3. Concur. Each of the USF&WS, USEPA, and NYSDEC recommendations (including USEPA items 1 through 10) have been incorporated and addressed in the DPR, EIS, and/or Appendices. Reference item 2 also.

14

TDS

4. Temporary restoration, soil erosion control, and streambank stabilization measures of disturbed areas should be installed as work proceeds along the natural channel and diversion channel.

5. Permanent restoration and revegetation should commence as soon as possible following the completion of construction activities.

6. Native plant species should be used to revegetate disturbed areas.

7. The emplacement of the concrete fabric and the grouting operation should be carefully monitored to minimize adverse environmental impacts.

8. The monitoring plan should include provisions to assure that streamflow and velocity rates in the natural channel are maintained as close to normal conditions as possible during construction. 3

9. Wherever possible, the concrete fabric should be installed in dry areas first. When placing the fabric in the natural channel, construction should begin at the downstream end and continue upstream to maximize dilution over the disturbed river bottom.

10. Flow rates and pH values should be monitored hourly during the grouting operation. At a pumping rate of 12 cubic yards of concrete grout per hour (i.e., the typical output of a standard sized pump), an instream flow of 5.4 cubic feet per second (cfs) would be required to limit the rise in pH to 1.0. The average flow in the Main Branch of Limestone Creek in the vicinity of the project area is approximately 100 cfs. The average flow on a dry summer day would be approximately 30 cfs. Therefore, daily grout operations should be terminated whenever the flow falls below 10 cfs or the pH rises 1.0 unit above the value recorded each morning prior to start of the day's grouting activity.

The revegetation and mitigation plan should incorporate a post-construction fisheries study to assess alterations in fish use in the natural channel. The revegetation and mitigation plan should also be subject to FWS, NYSDEC, and the Environmental Protection Agency's (EPA's) review and approval. 4

The creation of the diversion channel, excavation along the natural channel, and reshaping streambanks at the confluence will require dredging activities. The final EIS should discuss how much material is proposed to be dredged and where the dredged material is proposed to be placed. The final EIS should propose an acceptable dredged material disposal site, along with measures to control soil erosion of the fill material at this site. 5

EA-H-8

U.S. Environmental Protection Agency - Region II

Comments: 22 July 1985

3. Concur. Each of the USF&WS, USEPA, and NYSDEC recommendations (including USEPA items 1 through 10) have been incorporated and addressed in the DPR, EIS, and/or Appendices. Reference item 2 also.

4. Reference the Environmental Considerations section in the Detailed Project Report (DPR) - 6. Comment and response. Further details is addressed in the Final Reports and will be incorporated into the project plans and specifications.

5. Reference the draft report Addendum, Revision 2a, paragraph j. More details are incorporated into the final reports. Reference FEIS, page EIS-8, item j.

Overall, we believe that the draft EIS adequately addresses feasible alternatives, and that the selected alternative represents a cost-effective and sound solution for reducing flood damage along this segment of Limestone Creek. We do not anticipate any significant adverse environmental impacts associated with implementation of the proposed project, provided that adequate mitigation measures are employed, and subject to our review of the additional information
6 requested above for inclusion in the final EIS.

In accordance with EPA policy, we have rated this draft EIS as EC-2, indicating that we have environmental concerns (EC) with the overall project, and that additional information (2) regarding dredged material disposal and mitigation measures is required in the final EIS to resolve our concerns.

Thank you for the opportunity to comment. Should you have any questions regarding our comments, please call Mr. Robert Hargrove of my staff at (212) 264-5390.

Sincerely yours,

William P. Janklow

Barbara Pastalove, Chief
Environmental Impacts Branch

U.S. Environmental Protection Agency - Region II

Comments:
22 July 1985

6. Thank you for your review, comments, and recommendations. Recommendations will be incorporated to the extent possible. Environmental design measures are discussed in further detail in the final DPR and EIS reports and will be incorporated into the project plans and specifications.

EA-H-9

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Project Review
1500 Custom House
165 State Street
Boston Massachusetts 02109

IN REPLY REFER TO
(ER-85/891)

July 24, 1985

26 JUL 85 11 04Z OFC MGMT.OAS

Colonel Daniel R. Clark
District Engineer, Buffalo District
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207

Attention: Mr. Bill Werick

Dear Colonel Clark:

EA-H-10

The U.S. Department of the Interior has reviewed the Draft Detailed Project Report (DDPR) and Draft Environmental Impact Statement (DEIS) and Appendices for the Section 205 Flood Control Study of Limestone Creek in Onondaga County at Manlius, New York, dated May 30, 1985 (ER-85/891).

1 General Comments

Generally, the report (DDPR & DEIS) provides an adequate description of the considered alternatives, the proposed project, fish and wildlife resources of the project area, and project related impacts upon the fish and wildlife resources.

Specific Comments

DDPR

2 Page 29, fourth paragraph, seventh sentence - This sentence should be deleted, since it is unlikely that the rerouting of Mainstream Tributary Nine will effectively protect fry from cannibalistic older trout.

3 Page 31, sixth paragraph - The control structure(s) and floodwall in the vicinity of the upstream end of the high flow diversion channel should be constructed in a fashion which maintains a continuous instream flow in the mainstream of Limestone Creek during construction.

4 Page 32, eigth paragraph - The limits of any settling basin(s) should be provided so that the real or potential impacts of periodic dredging can be properly evaluated.

U.S. Department of the Interior
Office of the Secretary
Office of Environmental Project Review

Comments:
24 July 1985

1. Thank you for your review and comments.

2. The sentence was modified rather than deleted.

3. Concur. As stated. Reference item 5 comment/response addressing USF&WS 5 July 1985 comment letter also.

4. Under improved conditions, velocities in the channel upstream of the diversion will be reduced due to the increase in cross sectional area. It is anticipated that this area will capture most of the sediment retained in the project area.

DEIS

Page ii, third paragraph, second sentence and Page iii, second paragraph, first sentence - Statements regarding social and environmental acceptability made at these points contradict each other, they should agree. 5

Page EIS-7, sixth paragraph, sixth sentence - Complete enclosure of sixty feet of the rerouted portion of the Mainstream Tributary Nine is undesirable. Instead, an open top U-shaped concrete trough with natural substrate inclusive of various sized stones to create resting areas for migratory fish, should be used. 6

Page EIS-20, second paragraph - It should also be stated that benthos recovery will likely be less in the concrete bottomed sections of the Mainstream than in the sections with natural substrate. 7

Page EIS-21, third paragraph, fourth line - The word "water" should be inserted between "cold" and "fishery". 8

Page EIS-22, fifth paragraph, first sentence - The word "trout" should be inserted after "rainbow". 9

Page EIS-34, second paragraph - The following statements should be included to minimize the obvious adverse impacts to aquatic organisms:

1. The pumping of the concrete grout into the liner is begun at the downstream limit and proceeds from there upstream.

2. The "careful monitoring of pH values" is conditioned such that the range 6.5 to 8.5 is not exceeded unless natural occurring pH values can be shown to fall outside this range. Further, should this range be exceeded, pumping of the concrete grout would cease or the pumping rate slowed such that the pH remains within the above range. 10

Page EIS-35, second paragraph, last sentence - The verbage "subsequent increase" should be changed to "subsequent potential increase" since an increase is not guaranteed by an increase in benthic area alone. Other factors such as nature of the substrate, dissolved oxygen levels, and water temperature would also have a role. 11

Summary Comments

With proper attention to the above comments, particularly those dealing with the pumping of the concrete grout and maintenance of continuous instream flows, the proposed project should have fewer adverse impacts on fish and wildlife resources. Careful attention will be required during formulation of project plans and specifications to assure that the above are carried out. 12

Sincerely,

William Patterson

William Patterson
Regional Environmental Officer

EA-H-11

U.S. Department of the Interior
Office of the Secretary
Office of Environmental Project Review

Comments:
24 July 1985

5. The latter (page iii) was modified accordingly. The former page (page ii) pertained to the coordination, evaluation, and tentative plan selection prior to coordination of the draft report. The latter page (page iii) pertained to desirable satisfactory concurance occurring with coordination of the draft reports.

6. Preferred and alternate options were discussed among COE, USFWS, and NYSDEC personnel at 25 February 1985 and 4 August 1985 project meetings and at subsequent communications. A major reason why the surface open culvert option cannot be implemented is stated in EIS paragraph 2.20f. Safety concerns pertaining to steep or verticle slopes have also been expressed.

7. Paragraph modified.

8. Sentence modified.

9. Sentence modified.

10. Section modified. Also reference items 2 and 3 comment/response addressing USFWS 5 July 1985 comment letter; DPP and EIS plan descriptions; and the Environmental Considerations section in the DPR (Addendum to Draft DPR) addressing USFWS recommendations.

11. Sentence modified.

12. Thank you for your comments.

TDS

STATE OF NEW YORK
EXECUTIVE CHAMBER
ALBANY 12224

MICHAEL J. DEL GIUDICE
SECRETARY TO THE GOVERNOR

EA-H- 12

June 4, 1985

Dear Colonel Hardiman:

On behalf of Governor Cuomo, I acknowledge a copy of the Draft Detailed Project Report and Addendum, Draft Environmental Impact Statement and Appendices for the Section 205 Flood Control Study of Limestone Creek in Onondaga County at Manlius, New York transmitted with your letter of May 30.

Sincerely,

Michael J. Del Giudice

Colonel Robert R. Hardiman
District Commander,
Corps of Engineers
Department of the Army
1776 Niagara Street
Buffalo, New York 14207-3199

State of New York
Executive Chamber

Comments:
4 June 1985

1. Thank you for your acknowledgement. No Comment response necessary.

TDS

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
333 EAST WASHINGTON STREET
SYRACUSE N.Y. 13202

RICHARD SIMBERG PE
REGIONAL DIRECTOR

Franklin E. White
XXXXXXXXXXXXXX
COMMISSIONER

July 19,1985

OFC. MGMT. OAS
22 JUL 85 11 51 Z

District Commander
United States Engineer District, Buffalo
1776 Nigara Street
Buffalo, NY 14207
ATTN: Mr. Bill Werick

Dear Mr. Werick:

Re: Draft Project Report, Draft Environmental Impact Statement & Appendices for the Section 205 *Flood Control Study of Limestone* Creek in Onondaga County at Manlius, NY

Thank you for the opportunity to review the subject documents. We offer the following comments:

1. The description of the selected plan (page 30, Draft Project Report) states that "the new bridge would have the same low concrete elevation as the old top of arch elevation. The bridge deck could be installed at the same elevation as the existing deck." Based on the elevations in the report and on elevations of a recent NYSDOT project in the area, we concur that the bottom of the proposed superstructure and the existing superstructure would be approximately at the same elevation. The proposed roadway, however, will have to be from 1.5 feet to 2.5 feet higher than the existing roadway surface to accommodate the new bridge which will be thicker than the existing bridge.

   It should also be noted that the new bridge will most likely be on a slightly altered alignment to the west of the existing bridge and traffic will be maintained with staged construction. This will be determined during the preliminary stages of the bridge project.

   We will need to know the proposed water surface profiles, the channel bottom profile and the alignment of the new channel in order to design the structure.

State of New York
Department of Transportation
333 East Washington Street
Syracuse, NY 13202

Comments:
19 July 1985

1. Thank you for your review and comments. The Detailed Project Report (DPR) has been changed to show the correct roadway elevation for the replacement bridge. The probable realignment has also been noted in the text of the DPR. Improved water surface and channel bottom profiles are shown on plate A-27 of Appendix A to the DPR. A set of plans will be sent to you.

2. Table 3 "Itemized Cost Estimate for the Recommended Plan" (page 34, Draft Project Report), Item No. 15 shows a cost of $500,000 to replace the bridge including utility relocations. We currently estimate that $760,000 (including $65,000 for removal of the existing bridge and $10,000 for relocation of utilities on the bridge) would be needed to replace the bridge. The cost was based on the 80 feet of clear opening and the 11 feet of underclearance as noted on page 40 of the Draft Project Report. These costs do not include highway, utility relocation or maintenance and protection of traffic costs off of the bridge. We anticipate that the total cost of this project will be in the neighborhood of $1 million.

3. Table 4 "Cost Sharing" (page 36, Draft Project Report), shows that no Federal funds will be used to replace the NY Route 173 Bridge. Further, the Recommendation Section (page 39, Draft Project Report) states that the District Engineer recommends Plan 10 be implemented provided that NYSDEC supplies, "without cost to the United States," all alterations of existing improvements, including highways, required in connection with the construction of Plan 10. Please be informed that we intend to finance the NY Route 173 Bridge replacement project with Federal Highway Bridge Replacement & Rehabilitation (HBRR) funds. Furthermore, *any assurances* concerning the alteration of an existing highway would be made by this Department.

4. On page 38 of the Draft Project Report, it is stated that the Federal costs include the removal of the existing bridge. This expenditure should be included as part of the bridge replacement project instead of the flood control project since the existing bridge will most likely be used in the maintaining of traffic while the new bridge is being built.

5. Also on page 38 of the Draft Project Report, it is stated that "Relocation costs of the residents at Route 173 and the Main Branch will be borne entirely by the State of New York (20 percent)." If any residents have to be relocated due to the bridge project, the cost would be financed in accordance with the HBRR Program (80% Federal, 20% State).

6. The Recommendation Section (page 40, Draft Design Report) also states that the District Engineer recommends Plan 10 be implemented provided that NYSDEC provides a new NY Route 173 Bridge which has 11 feet of under clearance and 80 feet of clear opening measured perpendicular to the centerline of the project channel. As stated above, the NYSDOT would be the agency responsible for making assurances concerning transportation related facilities. It may be more appropriate to state that NYSDOT will be working in cooperation with the Army Corps of Engineers to ensure that the bridge replacement project is designed in harmony with the flood control project. In this way the emphasis is on the *mutual coordination of the* two projects rather than specific design considerations.

EA-H- 14

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State of New York
Department of Transportation
333 East Washington Street
Syracuse, NY 13202

Comments:
19 July 1985

2. The cost estimate has been revised to show the increased costs.

3. A footnote has been added to Table 4 which indicates that the "Federal" share of costs shown is the amount of Federal funding available under Section 205 of the 1948 Flood Control Act. The Recommendation Section of the DPR foreshadows the language of the Local Cooperation Agreement (LCA). The LCA is a legal contract between the United States and the local cooperator in which the local cooperator agrees to provide all non-Federal requirements for the project. NYSDEC acts as the local cooperator for all Federal flood control projects in New York State. NYSDEC can in turn sign agreements with other parties to provide certain portions of the local requirements.

4. The phrase "removal of the existing bridge" has been deleted, and the removal of the old bridge is now shown as a responsibility of NYSDOT.

5. The revised DPR shows 80 percent Federal cost sharing for relocations because of channel realignment.

6. Again, the language of the Recommendations Section foreshadows the LCA, so NYSDEC must guarantee that a replacement bridge with sufficient opening is constructed. A statement of NYSDOT cooperation has been added to the "Implementation of the Recommended Plan" section.

If you have any questions concerning our comments, please contact Phillip Calbo of our Regional Planning & Development Office at (315) 428-4409.

Sincerely,

RICHARD SIMBERG, P.E.
Regional Director of Transportation
Region 3

By

Richard A. Lucas
Planning & Development
Supervisor, II

cc: NYSDEC

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-0001

Henry G. Williams
Commissioner

August 29, 1985

Colonel Daniel R. Clark
U. S. Corps of Engineers
Buffalo District
Department of the Army
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Clark:

1 We wish to comment concerning the selected plan for Limestone Creek at Manlius, New York. We noted that the Detailed Project Report indicated that a significant quantity of sediment moves through the project area. Therefore, we ask that consideration be given to inclusion of a stilling basin immediately upstream of the fabric form channel. Such a basin would trap most of the moving sediment and allow easy access for maintenance. In addition, there may be benefits of reduced erosion of the lined channel.

2 Additional environmental comments are expected to be forthcoming soon from the Regulatory Affairs Unit.

Sincerely,

James F. Kelley
Director
Flood Protection Bureau

PFW:njc
cc: H. Carroll

EA-H- 16

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New York State Department
of Environmental Conservation

Comments:
29 August 1985

1. Under existing conditions, a considerable amount of sediment moves through Manlius, but most sediment is deposited downstream of the village. Under improved conditions, velocities will be increased everywhere in the project area except the widened section at the junction of the diversion and the Main and West Branches, so sediment will accumulate there. A need for access to that area has been identified in the DPR. Although erosion to the concrete lining is a concern, the use of proper aggragrate size should assure a long project life (see the Geotechnical Appendix, page C-32 for details on this). For these reasons, the recommended plan does not include a stilling basin upstream of the project. Since New York State Department of Environmental Conservation is the local sponsor, this issue can be discussed during the negotiations for the Local Cooperation Agreement, which will be held prior to the completion of plans and specifications.

2. The comments from the Regulatory Affairs Unit were received and are included in this Comment/Response Appendix.

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New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-0001
Division of Regulatory Affairs - Room 514

Henry G. Williams
Commissioner

September 12, 1985

Col. Daniel R. Clark
US Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Re: Draft EIS - 205 Flood Protection Plan
Limestone Creek, Manlius, New York

Dear Colonel Clark:

The New York State Department of Environmental Conservation has reviewed the above referenced draft document and offers the following comments:

1 - To prevent mortality to the resident and downstream aquatic life, the instream PH values must be kept between 6.5 and 8.5. Project activities should be adjusted to meet PH limits. The placement of a heavy plastic liner between the concrete liner and running water may be an effective means of maintaining PH levels.

2 - The design of the concrete liner should contain a continuous low-flow channel.

3 - Fisheries habitat should be provided in the form of pools at regular intervals.

4 - The placement of concrete should begin at the furthermost downstream point of the project and proceed in an upstream direction.

5 - No instream work should be scheduled from October 1 to May 15.

Thank you for the opportunity for review. We request an opportunity to review the final document when available.

Very truly yours,

Louis M. Concra, Jr. Director
Division of Regulatory Affairs

LMC/ERM:mm

cc: A. Coburn, L. Gumaer, E. Miller, File

EA-H-17

NYS Department of Environmental Conservation (Local Sponsor)

Comments:
12 September 1985

1. PH values will be monitored prior to and during construction. Project activities will be adjusted to meet pH limits if needed. If during construction it appears that pH values may become unacceptable, project activities would be adjusted (i.e. project activities may temporarily be stopped, the rate of cement grouting may be slowed up etc.). The possible use of heavy plastic liner as suggested will be given consideration as a possible method to help maintain pH levels.

2. As indicated in paragraphs 4.25 and 4.26 on page EIS-37 of the draft environmental impact statement, project design and construction will incorporate a low-flow channel to provide for fish access through the project zone.

3. Fishery habitat will be provided in the form of pools as much as possible where it is feasible to incorporate this measure into the engineering design. Placement of pools at regular intervals will be given consideration for incorporation into the design and specifications of the project.

4. As recommended, the placement of concrete will begin at the furthermost downstream point of the project and will then proceed in an upstream direction.

5. As recommended, the Corps will require that no instream work on the project will be scheduled from October 1 to May 15 by the Contractor.

LFB

Village of Manlius

ONE ELMBROOK DRIVE W MANLIUS NY 13104 • TELEPHONE (315) 682 9171

MAYOR Angelo (Arkie) Albanese • CLERK TREASURER Mary Jane Mercier • ATTORNEY Thomas F Quinlan

TRUSTEES Herbert Boerner, Winthrop B Collins Jr Thomas M Hennigan Harold H Hopkinson Edward Lowenstein Richard A Penhall

Village of Manlius
Mayor
for: Gray-Syracuse, Inc.

1. Reference next page.

Comments:
9 July 1985

July 9, 1985

EA-H-18

Robert R. Hardiman, Colonel
District Commander
Corps of Engineers, Buffalo District
1776 Niagara Street
Buffalo, NY 14207

Dear Colonel Hardiman

Here is a copy of a letter I received recently. Thought you would be interested in reviewing it.

Very truly yours,
VILLAGE OF MANLIUS, NY

Angelo Albanese
Mayor

AA/jad
enc. Letter 7/2/85
Gray Syracuse, Inc.

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Gray-Syracuse, Inc.

Chittenango, NY 13037 Phone (315) 687-0014

Mr. Angelo Albanese Mayor
Village of Manlius
Elmbrook Drive West
Manlius, N. Y. 13104

Dear Arkie;

July 2, 1985

Mr. James McCarthy (a Manlius resident and the Manlius plant maintenance person) reminded me about a possible problem affecting that building. Perhaps you and/or Vince could forward this concern to the Corps of Engineers.

There is a little noticed stream outlet that carried the water from the Swan Pond and from some of the village storm drains down a channel going under Seneca Tpk., under our office building, under the main manufacturing floor, and then out into Limestone creek at the west end of our building adjacent to the existing bridge. In the area of this exit the stream channel is going to be altered with cement walls. Should that stream under the building be closed or reduced, there would be serious consequences possibly to the Village and certainly to Gray-Syracuse. Example --- all the roof drains from the building flow into that under the floor stream.

Thanks for helping me.

Sincerely,

Dick

Richard E. Gray
Chairman

EA-H-19

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Gray-Syracuse/Village of Manlius

Comments:
2 July 1985

1. Thank you for bringing this to our attention. Since the water surface profile for the design flood in the area of Gray-Syracuse is five feet lower than under existing conditions, backup through that drain will occur much less often than before. During the preparation of Plans and Specifications, all pipes entering the stream will be catalogued and the need for flapgates resolved.

15 July 1985

OFC. MGMT. OAS
17 Jul 85 13 55z

George J. Lorefice
4694 Whetstone Rd.
Manlius, N.Y. 13104

District Engineer
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, N.Y. 14207

Subject: "Draft Response to Detailed Project Report and Draft Environmental Impact Statement, Limestone Creek, Manlius, N.Y."

Dear Sir:

1 I would like to express my concerns and offer recommendations in response to a review of the above documents.

2 My recommendation is to amplify alternative 2 to make it acceptable to Production Products. I do not agree with the report's reasoning for proceeding with Alternative 3 and have expanded on why I disagree in the following paragraphs.

3 My comments are based on a number of personnel view points:
1. Concerned resident of the Town of Manlius within 500 feet of Limestone Creek.
2. Frequent fisherman of Limestone Creek.
3. Aquatic biologist by education and 8 years working experience.

4 As a resident of the Town of Manlius I am aware of the need to protect residences and businesses from as much damage as possible during flood events. However I do not agree with doing so at the expense of a unique environment. In the reports I read, dollar values were placed on structures to be built and potential damages incurred; but what is the value of a beautiful trout stream? Can you put a price on the excitment of landing a trout or the calming influence of watching a stream flow over and around rocks?

5 It is apparent to me reading these documents that money is proposed to be spent to protect businesses and residences that were unwisely built or located within a known flood plain. Limestone Creek has periodically overflowed its banks since the last ice age and yet Manlius has allowed development within this area. I don't feel I and my children should lose an irreplaceable resource because of past errors. Two wrongs still don't make a right.

6 Another point is that if 75% of the damages are incurred by one business then 75% of the problem can be alleviated by moving them or having them increase their flood insurance. At the rate

EA-H-20

George J. Lorefice
4694 Whetstone Road
Manlius, NY 13104

Comments:
15 July 1985

1. Thank you for your review and comments.

2. The relocation of Production Products (Alternative 2) has several advantages over the Recommended Plan (Alternative 3). Nonetheless, the recommended plan satisfies the Federal objective of water resources planning, which is to maximize the contribution to the National Economic Development (NED), and the relocation of Production Products does not.

3. Acknowledged. The concerns of local residents and environmentalists are very important in our planning efforts. Again, however, to justify the financial involvement of the Federal government, we must recommend a plan which meets the Federal objective (see 2, above). Several working meetings were held with Federal and State officials as well as representatives from the Town and Village of Manlius, Fayetteville Rod and Gun Club, and Trout Unlimited to design a plan which met the Federal objective and minimized net changes to the existing habitat. The result of those meetings is the Recommended Plan shown in this report.

4. The economic analyses used to evaluate alternatives presumed that there would be no new structures in the floodplain because development is severely restricted by Flood Insurance regulations. We did assume that homeowners would, over a period of time, increase the value of the contents of their homes. The damages we predicted over the next 50 years are "potential" only in the sense that quantifying the average annual damage from flooding requires the use of statistically based predictions. While actual flooding damages may be less or more than the report predicts, there is little question that damages will occur. Finally, although there have been efforts elsewhere to put an economic value on certain recreation activities (usually based on the willingness of participants to pay for those activities), no such evaluation was done for this study. The recommended plan satisfies the absolute requirement for Federal participation in a local flood control project (contribution to NED), while minimizing environmental damage.

5. It is true that the development we are now protecting was unwise. It would have been far better if this type of development had been strictly regulated, as it is now. Nonetheless, development did occur, and the evaluation of alternatives in this study accepts that as fact and asks the question: "What is the best thing, from the Federal perspective, to do now?"

6. While it is true that relocation of Production Products would reduce flooding damages substantially, flood insurance merely allows individuals to share risk with others and distribute losses more evenly over a period of years. Relocation of Production Products was not feasible under current evaluation procedures because only subsidized costs of flooding (such as flood insurance overhead and subsidy, and emergency costs) can be claimed as a benefit in a non-structural solution. Whether Production Products remain indefinitely at its present location is, of course, uncertain. However, since the time our draft DPR was written, business has expended, and there is

6 businesses come and go or expand and grow, Production Products may not be here in 10 years, yet I and another generation or two will be stuck with a channelized creek.

7 Magnavox was also discussed in your report, and included with Production Products, as important to the cable television market. If it were so important why locate it in a known flood plain? Televisions can be created anywhere from basement workshops to outerspace; however one of the top 50 trout stream sections in New York State can not be.

8 Having participated in a stream survey of Limestone Creek (Water Quality Analysis of Limestone Creek, 1979, Dept. of Civil Eng., Syracuse University) as part of a course I took in 1979, I have a good feel for the hydrology and the benthic populations of the creek. I would hate to see the loss of any habitat on this section of stream if it is at all possible to avoid.

9 I hope you will take my recomdations and concerns into consideration during your deliberations. I am very sincere about avoiding further adverse alterations in the environment around Manlius. I have seen many natural areas fall to the bulldozer with little regard for the environment in the future. Expansion and growth can be important for a healthy community, but they must be done cautiously and with the overall environment taken into consideration for the long term.

Sincerely,

George J. Lorefice

George J. Lorefice

cc: K.P. Wick, NYS DEC, Albany.
P.P. Hamilton, USFWS, Cortland, NY.
B. Eberhart, Manlius Rod&Gun, Manlius, NY.

EA-H-21

no indication that the cable hardware business will suffer in the near future. Of course, a plant such as this can be modified to make slightly different types of hardware, which could prolong its life.

7. Magnavox is not located in the floodplain. Magnavox would be impacted by the sudden loss of supply from Production Products after a major flood.

8. Loss of habitat was a primary environmental concern. The Corps dropped a proposal to channelize the entire length of the Main Branch of Limestone Creek through Manlius because of those concerns, and adopted the diversion channel as an alternative which allowed about half the creek to stay in a natural state.

9. The points you raised in your letter have been of great concern throughout the planning process. Designing a flood control project in Manlius has been a slow process because of the difficult in balancing environmental, economic and safety concerns. It has also been an open process, with study input from Federal, state, county, town, and village governments, local businesses, individual citizens, public interest groups, and sportsmen's clubs in several public meetings. I feel that the project I am recommending represents the best balance of all concerns and reflects the consensus of the people involved.